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MAINTENANCE AND OPERATING INSTRUCTIONS OF THE RADAR SYSTEM K-1M

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NSA, DIA, USAF reviews completed

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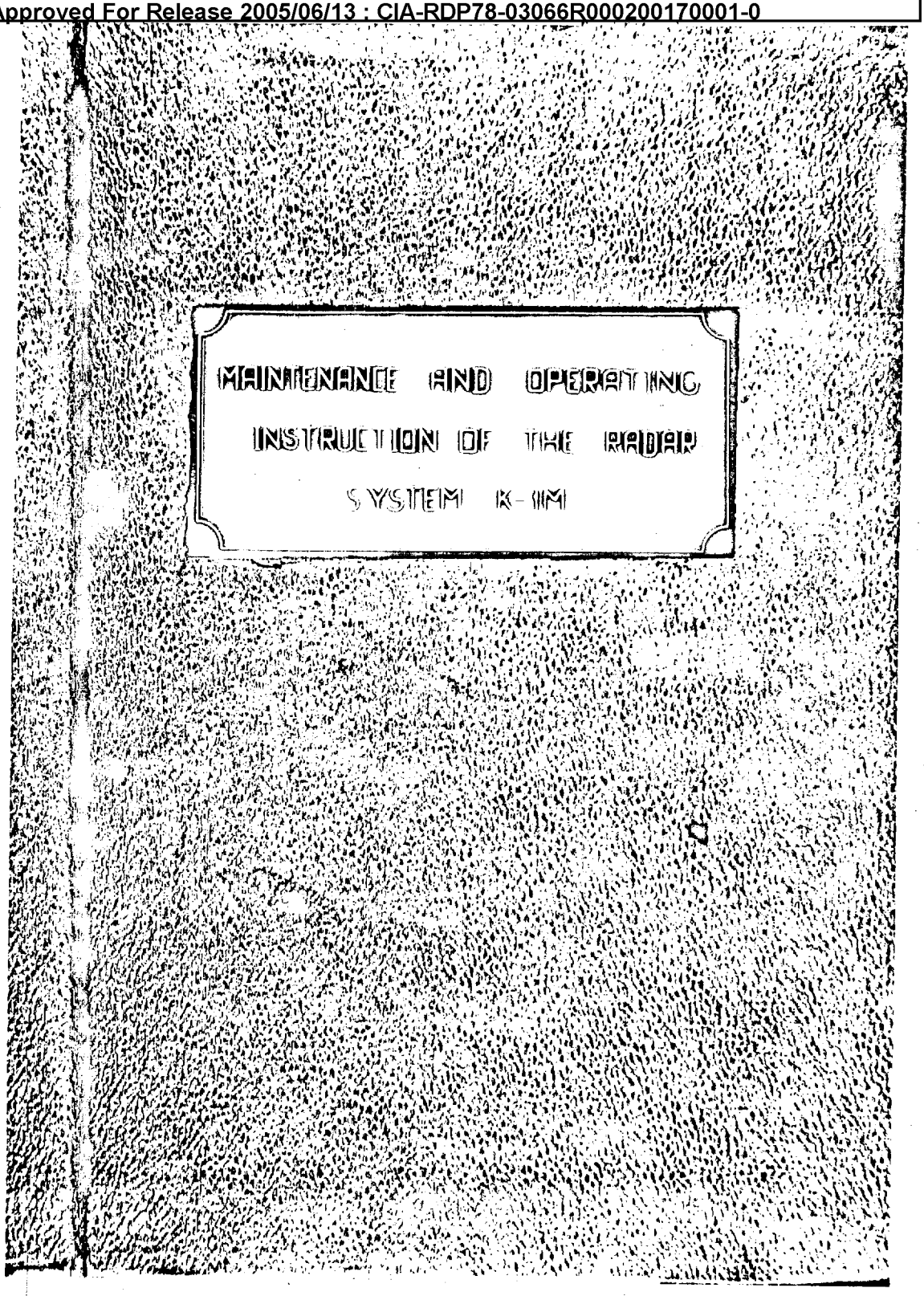

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INSTRUCTION OF THE RADAR SYSTEM K-1M

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INTRODUCTION

§ 1. Purpose of the Maintenance and Operating Instruction of the Radar System K-1M

This Maintenance and Operating Instruction is a main guiding document for the engineering and technical personnel, servicing the Radar System K-1M as a separate unit or as a part of the special air-borne equipment of the objects "KC", in checking it in hangar and storage and in preparing suspension of the objects "KC".

There are included herein the main indications, concerning Radar System K-1M maintenance at the following stages:

1. Installation in the object "KC".
2. Parameter testing.
3. Retuning at an another frequency.
4. Checking on suspension lug.
5. Bench checking.
6. Operating under winter conditions.
7. Storage.
8. Packing and unpacking.
9. Regulation works.
10. Transportation.

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The instruction is illustrated with block diagrams and explanatory drawings.

Persons, who have not made a close study of the Instruction are not allowed to operate the radar system.

The radar K-1V structure is shown below.

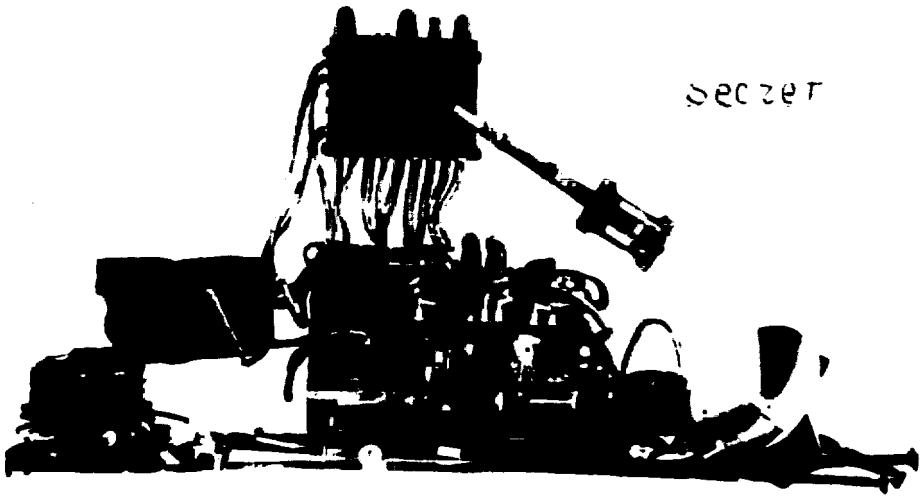

Fig.1. General view of the radar system K-1V

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CHAPTER I

GENERAL

§ 2. Arrangement of the Radar K-1M in the object "KO"

1. Antenna "A" (unit K1-1M) is placed in the back part of the top dome. The antenna mount is fastened to a mounting plate by means of four bolts. The antenna is covered from behind with a dome manufactured of foam polystyrene. An antenna dielectric rod jutting out from the dome is protected with a cap, which must be removed before operating the Radar K-1M. The last section of the waveguide channel (unit K1-3M) is connected to the antenna.

2. Waveguide channel (unit K1-3M) is laid along the leading edge of the fin and along the right board of the body. The waveguide fastening and the metallisation is realised by the use of special cramps, installed on silverplated parts of the waveguide.

The waveguide ends in a flexible section to connect with the unit K1 - 4 aM at the body head.

3. Mixer "A" (unit K1 - 4 aM) and Mixer "B" (unit K1-4 бМ) are placed on the right side of a damping framework (unit

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K1-0). The mixers are connected with flexible, waveguides of the units K1 - 3M and K1 - 7 M and with two cables (NN 8 and 2) going out of a junction box (unit K1 - 13M).

Note: The flexible waveguides of the units K1-3M and K1-7M must be disconnected, packed up in paraffined paper and tied to K1-10M unit handles, when object "KC" is to be transported.

4. Receiver "A" (unit K1 - 5 MP), Autopilot control unit (unit K1 - 6M), Receiver "B" (unit K1 - 8M), Range unit (unit K1 - 9M) and Rectifier (unit K1 - 10M) are arranged in damping framework pockets. Six cables from the junction box (unit K1 - 13M) and a coaxial cable from a responder (unit K1-12 MP) are connected with the above 4 mentioned units. Interunit wiring is carried out by using coaxial cables and in accordance with the numbers, engraved on the front panels of the units and on the cable connectors.

5. Damping framework (unit K1-0) is placed in the body nose block between frames 1 and 3 fastened through four shock-absorbers to block structural members.

The framework metallisation is provided with flexible crosspieces.

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6. Antenna "B" (unit K1-7M) is placed on a steel ring arranged in the body forepart. The antenna is fastened to the ring by means of three bolts, that pass through special adjusting devices.

The adjusting devices are fixed at the unit base and serve for the setting of the antenna electrical axis on the vertical plane at an angle of $1^{\circ}15'$ below the aircraft longitudinal axis. (Procedure of antenna K1-7M installation is expounded in the Instruction of Antenna K1-7M Alignment, which forms part of the object "KC" Operating Instruction).

The antenna "B" is connected with the mixer "B" (unit K1-46M) by using the flexible waveguide. Cable N 1 from the junction box (unit K1-13M) is attached to the antenna. A dome, made of foam polystyrene, covers the antenna. When the antenna is to be transported with the object, the waveguide must be fastened to a special bracket of the framework model with a view to strengthening the flexible section of the antenna waveguide.

Antenna metallization is made by the use of a flexible crosspiece.

7. Responder antenna (unit K1-11) is placed on the top fin dome under a special metal container.

The antenna is attached to a cast plate by using four

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studs. The cast plate is fastened to the top fin dome casing by means of four screws.

Coaxial cable N 31 from responder (unit K1 - 12 MP) is attached to the antenna. The antenna is covered from behind with a dome, made of foam polystyrene.

8. Responder (unit K1-12 MP) is placed in the middle part of the top fin dome. The responder is rigidly screwed to the damping frame with four bolts. The frame is installed on shock-absorbers and fastened to structural members of the top fin dome by means of four studs. The metallization is made by using two flexible crosspieces. The unit receives three cables: cable N 31 from the responder antenna (unit K1-11), cable N 15/2 from the junction box (unit K1-13M) and cable N 28/2 from the autopilot control unit (unit K1-6M).

9. Junction box (unit K1 - 13M) is rigidly fastened with four screws to the back wall of frame 3. Coupling cables going out from the junction box are connected with the Radar System units and motor-alternators MA-500M and MA-250M. The cables from the responder, the autopilot, the missile-borne power-source and the umbilical connection PK-63 are attached to connectors, placed on the right wall of the junction box.

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10. Motor - alternators MA-500M and MA-250M are installed on brackets in the second block between frames 3 and 6. The motor - alternators are provided with shock-absorbers. The alternator housings are metallised by using flexible crosspieces. Cables N 18 and N 17 interconnect the alternators and the junction box (unit K1 - 13M). The missile-borne power supply is fed to the motor-alternators from a "KC" object fuse board.

§ 3. Installation of the framework with its units and the unit K1 - 12 MP in the object "KC"

The framework with its units and the unit K1-12 MP should be installed in the object "KC" only after careful superficial examination of all the Radar System units, including those placed in the object "KC". Particular attention should be given to possible breaks of the flexible waveguides, possible corrosion, damage of the antenna K1-4M polystyrene rod, brackets, metallization crosspieces, shock - absorbers, motor - alternator fastening means as well as probable breakage of the power wire thimbles, feeding voltage to the motor - alternator MA-500M.

For the purpose of installing the framework with its units in the object "KC" it is necessary to:

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a) Open the top body hatch between frames 1 and 3;

b) Unlock and disconnect the connectors from the framework K1-0 model;

The connectors must be guarded against shocks to prevent them from damage.

c) Detach the unit K1-7M flexible waveguide from the framework model bracket;

d) Separate and take away framework K1-0 model from the object "KC"; pull out the unit K1-3M flexible waveguide from a special pocket of the model, unpack and examine it;

e) Examine and, if it should be necessary, blow through the block with the dry compressed air, giving particular attention to possible presence of a foreign body (wire pieces etc);

f) Lift the framework K1-0 with its units over the block between frames 1 and 3;

g) Lower down the framework carefully in its place so as to put the framework brackets on the nuts of the shock-absorbers AD-8 and to match bracket holes with nut holes of the shock-absorbers.

In lowering down the framework it is necessary to defend it carefully from shocks against edges and ribs of the block. In order not to be damaged, the unit K1-7M flexible waveguide should be bent and held.

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Note: 1. Fastening set of the framework (shockabsorbers, screws, bolts, ground buses) must be stored in the packing box of the unit K1-12MP.

2. The installation of the framework with its units in the object "KC" hatch is realized by two fitters by hand.

h) Fasten the framework with its units using four bolts; washers and thimbles with the metallization cross-pieces soldered to them should be laid under the bolts; screw up the bolts firstly by hand and then tighten by means of a special socket wrench;

i) Install foam rubber dampers on the framework corners and screw them to the block body;

k) Connect the flexible section of the waveguide KI-3M to its rigid section; remove preliminarily a closure of the rigid section;

l) Connect the flexible waveguides of the units KI-3M and KI-7M to flanges of the units KI-4 eM and KI-4 M; remove preliminarly closures;

connect the waveguides with care in order not to damage nut and flange threads; the nuts must be tightened as far as it will go so that waveguide flanges may be closely adjoined;

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m) Attach the cables to the Radar units in accordance with the numbers engraved on the connectors and units; when connecting, make it with care in order not to damage pins and thread; nuts should be tightened as far as it will go with a view to adjoin the connectors closely.

n) Close the top body hatch between frames 1 and 3.

When installing the unit K1-12 MP in the object "KC" it's necessary to:

a) Open the hatch of the top fin dome and separate vinyl chloride studs, fastening cables N 18/2, N 28/2 and N 31.

b) Examine and, if it should be necessary, blow through the interior of the top fin dome;

c) Install the unit K1-12 MP on the damping framework and bolt it; washers must be laid under the bolt heads; under the heads of two bolts should be laid terminals of the metallization crosspieces too; remove closures of the unit K1-12 MP connectors;

d) Remove closures of the cable connectors N 15/2, N 28/2 and N 31; attach them to the unit K1-12 MP; tighten the nuts with care in order not to damage contacting members and threads;

e) Put the damping ring on the unit casing and bolt it to the fin dome casing.

f) Close the top fin dome hatch.

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The taking down of the framework with its units and the unit K1-12 MP should be carried out in reverse order.

When installing the equipment it's necessary to prevent painting and seals of the potentiometer knobs from damage.

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CHAPTER II

Parameter testing of the Radar System K-IM installed in the object "KC"

§ 4. General

a) The parameter testing of the Radar System K-IM should be practised on installing the Radar in the object "KC" as well as periodically, at the regulation works, and before flight.

Note: With a view to cheking reliability of the fastening of the units, the framework, the cables and the connectors and to determining if there are damages of the waveguide flexible sections, a careful ground check of the Radar K-IM must be made before flight.

If the previous parameter testing of the Radar was carried out no more than 10 days before, a new parameter testing is not obligatory before flight.

b) The Radar parameter testing has for an object the determining of their conformity with the data, given in the Istruction.

The parameter testing should be made by using a measurement unit K-100M. The placing of the measurement unit K-100M

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and the testing of its capability must be made before beginning measurements and in accordance with the Provisional Instruction of the Unit K-100M Operation. The Radar System may be considered siutable for operation if the values obtained in measuring the parameters completely conform to those, given in the Instruction.

Data obtained in the course of the periodical parameter testings of the Radar should be noted down in a special register, which is to be available in the military unit (see Appendix N I).

c) The maximum permissible continuous operating time of the Radar System K-IM is 60 minutes, except the units KI-12MP and KI-7M. The repeated switching on of the Radar K-7M may be done after a 30 minutes'interval. The continuous duty cycle of the units KI-I2MP and Kl-7M involves a 30 minutes' operating period and the 30 minutes' interval.

For the purpose of ensuring the normal temperature conditions of the Radar K-IM in the process of the ground adjustments of the "KC", it is necessary to blow on the Radar K-IM by using two fans, placed in the object "KC" front end, on the left and on the right of the unit KI-0.

The continuous duty cycle of the time mechanism (ПД)involves an operating cycle and a 15 minutes'interval.

To avoid depleting the Radar resources prematurely it's necessary to reduce the test operating time as much as possible.

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Note: Necessary cuttings in and cuttings out of the Radar are indicated in the Procedure. If an interval during the testing exceeds 5 minutes it should be recomended to cut out the Radar during this non-operating interval.

d) An d-c supply (voltage 27±1,5 v; power no less than 5 kwt) is used in feeding both the supervisory and measuring equipment and the missile-borne network of the object "KC".

e) The parameter testing of the Radar System K-IM must be carried out in a sequence, indicated in the Instruction. Before testing Radar parameters it is necessary to examine all the interunit connections and be made sure that there are not obvious damages of the units and cables.

Note: If Radars K-IM are to be transported or stored, their "ПД" must be set in the end position after finishing the testing.

f) In Radar parameter testing the object "KC" should be installed on an area, which meets the following requirements:

1. The area must be no less thau 6x15=90 sq.m.

2. Height up to the roof, cross-beams etc.must be no less than 4 m. Approximate placing of the object "KC" and of the unit K-100M on the area is shown in the Appendix N 7.

3. Foreign bodyes are not allowed to be in the room, having the above-mentioned volume.

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g) The object "KC" should be installed strictly horisontally (without bank).

With a view to obtaining it, it's necessary to:

1. Install a levelling plate (drawing N 07-KC/053A) in the warhedd compartment.

2. Install a type KO-I levelling instrument on the plate.

3. Install the "KC" in accordance with the level to within, $\pm 1^{\circ}$ by using adjusting screws of the trolley.

§ 5. Program of the Radar K-IM parameter testing

The Radar parameter testing should be carried out after preparing the equipment according to § 6.

The following Radar parameters must be tested:

1. Radar K-IM tuning at a Radar K-IIM transmitter frequency.
2. Delay time of the radio control switch on (command N 1).
3. AFC channel sensitivity.
4. Synchronization channel sensitivity.
5. Control voltage unbalance.
6. Sensitivity of the error channel "A".
7. Transconductance of the control voltages "A".

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8. Phasing error "A" and angle between the axes of coordinates.

9. Initial pulse delay in the regime "A" or "B"; frequency and power of the responder.

10. Range unit search period.

11. Regime "B" interlocking time.

12. "Memory" time, lock and release sensitivity of the relay, commutating to "B" regime (command N 2).

13. Locking on and tracking range of the echopulse.

14. Phasing error and transconductance of the control voltages of the regime "E".

15. Checking of the Kacar K-IM network coupling it with the autopilot A K-5BK and the mother-ship equipment.

Note: When the unit C/KC-IA is to be used in the object "KC", itś necessary to follow the Instruction of the Unit C/KC-IA Operation (See appendix N 15).

§ 6. Preparation of the equipment, destined to test the regime "A" parameters

With the object of testing regime "A" parameters interconnect the equipmont in conformity with the block-diagram (See Appendix N 2).

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Before beginning the parameter testing a capability of the equipment must be checked.

To obtain it it's necessary to:

1. Set the unit K-101M control devices in the following positions:

a) The switch "частота" is in the position "D"
b) -"- "инд.нуля" -"- "уст.0°ТВ"
c) -"- "задержка" -"- "ручная"
d) -"- "гр зан.ЗI-ИИ" -"- "задерж."
e) -"- "скор.задержки" -"- "быстро"
f) -"- "прибор" -"- "вход.ТВ"
g) -"- "модуляция" -"- "выкл."
h) -"- "накал" -"- "выкл."
i) -"- "анод" -"- "выкл."
j) -"- "синхр." -"- "внутр."
k) -"- "Н.ч." -"- "внутр."

l) The knob "ампл.мод.Л" must be turned to the right as far as it will go.

m) The knob "ампл.синхр.Л" must be turned to the right as far as it will go.

The rest of control knobs (except "фаза" and "яркость") must be turned to the left as far as it will go.

Warning: Controls with slotted heads should not be touched.

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2. Board K-109 control devices must be set in the following positions:

a) The switch " ток кристалла " in the position "A"

b) -"- "АРУ" -"- "A"

c) -"- "ком.отц." -"- "выкл."

d) -"- "питание станции" -"- "выкл."

e) -"- "ком. № 1" -"- "внутр."

f) -"- "ком. № 2" -"- "внутр."

g) -"- "возврат ПД" -"- "выкл."

h) -"- "ком. № 3" -"- "внутр."

i) -"- "контр.питания" -"- "+27"

j) -"- "эквивалент АП" -"- "выкл."

k) -"- "отцепка" -"- "выкл."

l) -"- "запуск ПИ8-МО" -"- "выкл."

m) -"- "контроль" -"- "К-109"

n) -"- "режим контроля" -"- "Режим А без"

o) -"- "ОН А/Б" -"- "С"

Note: In testing the Radar the autopilot must be attached to the Radar (check the connection of the cables N 12 and N 44).

3. Set the toggle switches "Radar", "Responder" and "Antenna" of the unit KI-13M in the position "ex".

4. Attach power cables of the unit "АП" (power-supply set) and of the object "КС" to the d-c power supply (voltage 27 ± 1,5 v) and check the voltage by using the board "K-109"

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instrument " КОНТРОЛЬ ПИТАНИЯ ". Voltage should be within the above-mentioned limits.

5. Cut in the toggle switch " НАКАЛ " of the unit "К-101М".

Switch on the power supply of the Radar tester "31 ИК" and of the oscillograph И0-4.

Cut in the moter-alternators, feeding the equipment К-100М, by using the toggle switches "МА N 1" and "МА N 2" of the unit "ЩАУ".

Variable voltages of the sockets "МА N 1" and "МА N 2" (unit " ЩАУ ") must be set according to readings of the avometer "Ц -312" or "АВО-5М" and should be 115 v.

Note: If the voltage "МА N 2", measured with the avometer Ц -312 or АВО-5М, is 115v ÷ 106 v, the operation is allowed on condition that external control resistors of the unit "ЩАУ" are fully put in operation.

Cut in the toggle switch "plate" in 1 - 2 minutes after switching on the unit К-101М filament. Preheat the unit during 30 minutes.

6. Tune the Radar tester 31-ИМ at a frequency "Цк" in accordance with the "Instrument 31-ИМ Operating Instruction".

Note: If the Radar К-1М is to be tuned at the transmitter frequency of the Radar К-11М, the Radar tester 31-ИМ must be tuned at the frequency of the above-mentioned transmitter (See item I, § 7).

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The Radar tester 31-ИМ output power should be fixed I mW. род работы
The switch "Kind of work" should be set in the position "IV внеш.".

7. By the use of the knob "Вход р.В." of the unit K-101M, adjust crest voltage of the frequency "10". The crest voltage should be 60v according to the unit K-101M instrument.
прибор блока К-101М

8. Set the switch "Unit K-101M" instrument in the position "ЧМ" and fix the percentage frequency modulation of video pulses, that must be I,I%. This should be made by using the knob " вмпл. он 0°; 90°".

9. The switch "прибор " must be set in the position " " дальн.". Delay of the pulses, triggering 31-ИМ, should be 100 μ sec. according to the unit instrument.

10. Attenuations of the Radar-tester 31-ИМ attenuators N 1 and N 2 as well as those of the additional attenuators N 3 and N 4 must be fixed on zero, while the attenuations of the additional attenuators N 5 and N 6 must be fixed maximum.

11. Set board K-109 toggle switch " питание станции " in the position " вкл." (switch on the Radar). By using the instrument Ц-312 or AB05M check the variable voltage of the monitoring jacks "МА-500М" and "МА-250М" of the unit КI-10М. The checking must be cabried out 5 minutes later. Voltage value should be 115 ± 5 v.

Note: a) If the voltage of the monitoring jacks "МА-500М" or "МА-250М" does not keep within the abovementioned tolerance of

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115 ± 5v, but keeps within the limits of 115 ±10 v, it is permissible to adjust it by means of the potentiometers "RA-500M" and "RA-250M", installed in the unit KI-13M, to obtain its nominal values.

b) Before switching on the Radar K-1M, disconnect the cable N 28 from the unit KI-5M. The cable N 28 may be connected after a lapse of 15 minutes.

12. In 5 minutes after switching on the Radar check its capability:

a) check the values of the unit K1-10M rectified voltage by the use of the avometer " Ц-312" (АВО-5М) or "КОНТРОЛЬ ПИТАНИЯ" of the board K-109. Rectified voltage values must be kept within the following limits:

Voltage	+130 v.	reg.	+130 ± 6 v.
-"-	+130 v.	reg.	+300 ±10 v.
-"-	-300 v.	reg.	-300 ±10 v.
-"-	-147 v.	reg.	-147 ± 6 v.
-"-	+300 v.	unreg.	+300 $^{+30}_{-20}$ v.

Note: In measuring positive voltages, switch on the instrument between the sockets "+" and " ▼ "; in measuring negative voltages, switch on the instrument between the sockets " ▼ " and " + ".

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b) Check the crystal currents "A" and "B" by using the board K-109 instrument " Ток кристалла". Current value must be within the limits of 0,2 - 0,8 mA.

c) Check the A.G.C. voltage when the board K-109 toggle switch is in the position "A". When a signal level is -45dbm at the mixer "A" input the output voltage A.G.C. should be within (-0,8 v) (-3,5 v).

d) Make sure, that in switching on the switch "ОН А/Б " from the position "0°" to the position "90°" the instrument "ОН А/Б " of the board K-109 shows a reference voltage value of $1,8 \pm \begin{matrix}1,0\\0,6\end{matrix}$ v.

Note: If reference voltages "A" don't keep within the indicated tolerances, but their values are no less than Iv, it's permitted to carry out adjustment by means of the potentiometer "ампл.ОН " of the unit "KI-6M".

The lamps " нач.ПД " and "Контроль токов" of the board K-109 must be lit up. If the lamp "нач. ПД " is not lit up set the range potentiometer in the initial position and with this end in view cutin the toggle switch " ком.отд". and no less than in 30 seconds after reaching the end position of the range potentiometer " ПД" cut out the toggle switch. On reaching the end position a lamp "конец ПД" must be lit up.

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Then cut in the toggle switch "возврат ПД" and cut it out after reaching the initial position of the "ПД" (the lamp "нач. ПД" is lit up). Checked the capability switch off the Radar. Disconnect the cable N 28 from the unit K1-6M.

Set the toggle switches "responder" and "antenna" of the unit KI-13M in the position "off".

Note: In case of failure units, tubes or crystals, may be replaced in accordance with the Tube Replacement Instruction (see Appendix 5) and the Unit Replacement Instruction (See Appendix 6) with permission of the commanding officer or his deputy.

After replacing tubes the units and spare set must be sealed. Tube (crystal) or unit replacement should be stated in a report, which must be approved by the commanding officer or his deputy. The report and the faulty tube (unit) should be sent back to the Radar K-1M Manufacturer.

It should be pointed out in the report:

a) tube (unit) operating time from the data of Radar manufacturing;

b) feature of Radar defect, concerned with the tube (unit) failure;

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c) tube (unit) operating time from date of the last Radar switching on;

d) Some another information.

§ 7. Testing procedure of the regime "A" parameters

1. Radar K-1M tuning at a Radar K-11M transmitter frequency.

Radar K-1M tuning at a Radar K-11M transmitter frequency as well as tuning test should be carried out after being determined mother-ship in which the object "KC" will be suspended.

To tune the Radar it's necessary to

a) Measure Radar K-11M transmitter frequency by the use of the radar-tester 31-ИМ of the set K-100M used for the Radar K-1M testing.

Frequency measuring should be carried out in accordance with the Radar K-11M Operating Instruction.

b) Radar tester 31-ИМ should be tuned at a Radar K-11M transmitter frequency of the mother-ship, for which given object "KC" is to be prepared. The tuning must be carried out in accordance with the Radar tester 31-ИМ Operating Instruction.

c) Set the following attenuations:

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for the attenuators NN 1, 2, 3 and 4 - 0 dbm;

for the attenuators NN 5 and 6 - max.

d) Give pulses from the unit K1-5MP monitoring jack "CF.AFC" to oscillograph input.

e) Switch on the Radar and heat it during 10 minutes.

f) Set the switch "A.F.C. - Manual" of the unit K1-5MP in the position "Manual".

g) By turning the unit K1-5MP knob "Manual" and the klystron mechanical tuning knob (unit K1-4aM) maximize readings of the board K-109 instruments " and "APY -4". The mechanical tuning knob must be set in a position, which provides positive pulses on the oscillograph screen. Pulse amplitude should be aproximately one half of its maximum value; when turning the knob counter-clockwise, the pulses increase, when turning clockwise the pulses decrease, changing the polarity.

Attach the avometer TT-1 to the monitoring jack "Reflector" of the unit K1-5MP.

Veltage readings on the avometer scale should be within the limits -135v - -180 v.

Note: In tuning the Radar at a frequency, which is lower, that the frequency "Ц k", klystron mechanical tuning knob should be turned clockwise, and in tuning at a higher one the knob should be turned counter-clockwise.

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h) The unit K1-5MP switch "AFC - manual" must be set in the position "AFC"; the avometer TT-1 reading variances should not be more than 8 v.
Cut out the avometer and commutate the toggle switch several times; readings of the board K-109 instruments "
and "APУ -A" must not vary in this case.

i) Turn the unit K1-5MP potentiometer "A.F.C." knob to the left to stop the auto-control, and then turn it to the right to stop the one. In stopping the auto-control fix potentiometer limb readings and set the potentiometer "AFC" in a middle position between the fixed limb readings.

j) Cut out the Radar and one minute later cut it in again. Check whether the AFC locking of the signal frequency is reliable. The AFC locking reliability is to be determined by observing pulse train from the unit K1-5MP minitoring jack "C.f.e.-signal" on the И0-4 screen. The pulse train must be flat (without vallies).

k) By using the unit K-101M switch cut out 31-ИМ triggering pulses and one minute later cut them in; check whether the AFC locking of the signal frequency is reliable.

l) Measure the AFC channel sensitivity in accordance with the procedure, indicated in the item 3 § 7. The measurements should be carried out at the transmitter K-IIM frequency as

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well as at two frequences, differing from it by ± 18 Mc.

Note: The Radar is considered all right if the AFC channel sensitivity is within the limits of -50 ÷ -76dbm.

2. Checking of the delay time of the radio control switch on (command N 1).

The checking of the delay time of the radio control switch on (command N 1) consists in delay time measuring of the radio control after switching on the drop command.

When checking the command N 1 it's necessary to:

a) Cut in the toggile switch "КОМ.ОТЦ." of the board K-109 and simultaneously start stop-watch.

b) Measure the command N 1 switching time in the moment of the lamp lighting up (without stopping the stop-watch).

c) Cut out the toggle switch and stop-watch in 60 seconds after cutting in the toggle switch "КОМ.ОТЦ".

The command N 1 must be switched on in 39 ± 2 sec.

3. Channel A.F.C. sensitivity checking

To check the channel A.F.C. sensitivity it is necessary to measure the minimum power of the amplitude modulated signal at the mixer K1-4 aM input, when the system AFC

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passes from a searching regime to an automatic frequency control regime.

To accomplish this item it's necessary to:

a) Set the following attenuations:

for the attenuators NN 1, 2, 3, 4 - 0 dbm

for the attenuators NN 5, 6 - max.

b) Give pulses from the unit K1-5MP monitoring jack "CF AFC" to oscillograph input.

c) By means of the knob "АМПЛ.МОД.НАПР." of the unit K-101M set signal percentage amplitude modulation on the level of 60% (in accordance with the unit K-116M percentage modulation/voltage response).

d) Increase attenuations of the attenuators N 1 and N 2 until periodical disappearance of the video pulses takes place. Then decrease attenuations of the attenuators N 1 and N 2 until stable video pulses appear on the oscillograph screen. Register the attenuator readings. The channel AFC sensitivity, expressed in decibels relative to 1 mW, should be considered as a sum attenuation (expressed in decibels) of the attenuators N 1, 2, 3 and 4; of the equipment K-100M UHF channel "A" and of the waveguide K1-3M.

Note: The attenuation, caused by the waveguide K1-3M, must be taken from the object "KC" Book (Part 0,1).

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The channel "A" attenuation must be found in accordance with the Equipment K-100M Operating Instruction. The channel "A" consists of the waveguide triplet, attenuators N 3 and N 4, K-116M modulator, antenna K-103M coaxial-waveguide connection and the adapter "K-103M to K1-1M".

The channel AFC sensitivity must be within -50 ÷ -76 dbm.

4. Checking of the natural oscillation period of the synchronization channel blocking-generator

a) Set the attenuations of the attenuators N 1 and N 2 max.

b) Give pulses from the monitoring jack "C.F.Synch" to UO-4 oscillograph input. The oscillograph kind of work is aninternal triggering and a single sweeping.

c) By using time calibration marks meter natural oscillation period of the synchronization blocking-generator; the period must be longer than the "Ш" period by 75 ÷ 150 μsecs.

d) If the natural oscillation period does not keep within above-mentioned tolerances, but lies within the limits of 25 ÷ 175 μsec., it's necessary to readjust the blocking-generator period by means of the potentiometer "cycle of blocking g. synch.", which is mounted on the unit K1-5MP front panel.

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5. Checking of the synchronization channel sensitivity

To check the synchronization channel sensitivity it's necessary to measure [redacted] the minimum power of the amplitude modulated signal at the mixer K1-4aM input, when reference voltages become stable.

To accomplish this item it's necessary to

a) Connect the board "K-109" monitoring jack "ОН А/В" 0° to the oscillograph input; set the oscillograph sweeping in the natural oscillation regime.

b) Set the zero attenuation for the attenuators NN 1,2,3 and 4, and the maximum attenuation for the attenuators NN 5 and 6.

c) Set signal percentage amplitude modulation on the level of 60%.

d) Increase attenuations of the attenuators N 1 and N 2 until reference sinusoid on the oscillograph screen distores and the board K-109 instrument "ОН А/Б" pointers tremble.

e) Then decrease attenuations of the attenuators N 1 and N 2 until reference voltage becomes sinusoidal and readings of the above-mentioned instruments become stable.

In tuning the Radar K-1M, reference voltage fluctuations are permitted in the limits, which entail not pulsation of the driving voltages (in unison with the unit K1-9M search period).

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The synchronization channel sensitivity, expressed in decibels relative to 1 mW, should be considered as a sum attenuation of the attenuators MN 1, 2, 3 and 4, of the equipment K-100M, UHF channel "A" and of the waveguide K1-3M.

The synchronization channel sensitivity must not be worse than - 48 dbm.

6. Checking of the control voltage unbalance

The checking of the control voltage unbalance consists in determining the output stage balance stability of the unit K1-6M after short-time overloads.

The checking must be carried out with the range potentiometer positioned on the 60 th second.

To check it's necessary to:

a) Set the following attenuations:

for the attenuators N 1, 2, 4 - 0 db.

for the attenuators N 5, 6 - max.

b) Turn the unit K-101M knob " ВМЕЛ. УОД. НАПР " to the left as far as it will go.

c) Check the control voltage channel balance: pointers of the instruments " УН курса " and " УН высоты " of the unit K-109 should be positioned exactly on zeroes. When the unbalance takes place, it's permitted to carry

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out a balancing by using the potentiometers "balance Y" and "balance X" of the unit K1-6M. In balancing it is necessary to make sure that U.H.F. pulse modulation is absent.

d) Set the control voltages "КС ВВЕРХУ " and "КС СПРАВА" as high as possible by means of the knobs "АМПЛ.МОД НАПР. " and " ФАЗА" of the unit K-101M; keep this Radar regime during 30 sec.

e) Set the control voltages "КС ВНИЗУ " and "КС СЛЕВА" as high as possible by means of the knobs "АМПЛ.МОД.НАПР. " and "ФАЗА" of the unit K-101M; keep this Radar regime during 30 sec.

f) Turn the knob " АМПЛ.МОД НАПР. " to the left as far as it will go and check control voltage unbalance in 30 sec. by using the board K-109 instruments "УН КУРСА " and "УН ВЫСОТЫ ". Pointer deviation from the zero mark must not be more than ±0,25 v.

7. Checking of the error channel "A" sensitivity

The checking of the error channel sensitivity consists in measuring the power level of the amplitude modulated signal at the mixer K1-4aM input, when the control voltage has dropped to a point, where it is 70 percent of the value, measured at the input power of -35 dbm (approx).

The checking must be carried out with the range potentiome-

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ter positioned on the 60th second.

In checking it's necessary to:

a) Set the following attenuations:

for the attenuators NN 1,2,3 and 4 - 0 db;

for the attenuators NN 5 and 6 - max.

b) Set the following driving voltages:

course channel - 4 v

elevation channel- 0 v

The setting should be realized by the use of the knobs " амплитуда " and " фаза " of the unit K-101M in accordance with the readings of the board K-109 instruments "УН курса " and "УН высоты".

c) Increase the attennations of the attenuators N 1 and N 2 until the driving voltage, indicated on the instrument "УН курса " decreases to 2,8 v.

The error channel sensitivity, expressed in decibels relative to 1 mW, should be determined as a sum attennation of the attenuators NN 1,2,3 and 4, the UHF channel "A", the equipment K-100M and the waveguide K1-3M.

The error channel sensitivity must not be worse than -45 dbm.

8. Checking of the "A" control voltage transconductance.

The checking of the driving voltage transconductance consists in determining the driving voltage values in volts per

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1 percent of the error channel pulse amplitude modulation.

The checking must be carried out with the range potentiometer positioned on the 60th second.

To realize the checking it's necessary to:

a) Set the power at the "A" mixer input within (35÷40) dbm and the attenuation of the attenuators N 5 and N 6 - max.

b) By means of the knob "ВНУТР. МОД. НАПР." of the unit K-101M set UHF pulse percentage modulation on the level of 40% (in accordance with the unit K-116M percentage modulation/voltage response). Set one of the driving voltages equal to zero by using the knob "ФАЗА" of the unit K-101M.

c) Determine the transconductance of the driving voltages using the formula:

$$S = \frac{U}{40} \text{ (v./mod.\%)}$$

where S - driving voltage transconductance

U - driving voltage values (v.)

The driving voltage transconductance must be within the limits 0,08 ÷ 0,12 v/mod.% for the temperature range +45°C up to -20°C, and within 0,07 ÷ 0,13 v/mod.% for the temperature range -20°C up to -40°C.

Note: If the driving voltage transconductance does not keep within the indicated tolerances, but is within the limits 0,07 - 0,13 v/mod % (for the

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temperature range +45°C up to -20°C) or within the limits 0,06 - 0,14 v/mod % (for the temperature range -20°C up to -40°C), it's necessary to adjust it by using the unit K1-6M potentiometer "amplification " so as to reach its value, corresponding to the nearest tolerance limit of the given temperature range.

9. Checking of the phasing error "A" and angle between the axes of co-ordinates.

The checking of the regime "A" phasing error consists in measuring the phase shift angle of the UHF pulse amplitude modulation envelope relative to recurrence frequency modulation phase; this angle determines phasing drift value.

The checking must be carried out with the range potentiometer positioned on the 120 th second.

To realize the checking it's necessarry to:

a) Set the mixer "A" input power within 35±40 dbm and the attenuation of the attenuators N 5 and N 6 - max.

b) Set the unit K-101M switch "МОДУЛЯЦИЯ " in the position "ВМ".

Set the switch "Прибор " in the position "ВМ" ("ОН 0°") and the percentage modulation on the level of 1,1% by using

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the knob " ВЫКЛ. ОН.0°; 90° и глубина "ЧМ" and in accordance with readings of the unit K-101M instrument.

c) Set the range potentiometer " ПД " on the 120 th second. With that end in view, the board K-109 switch " КОМ.ОТЦ." must be cut in once again during 60 seconds. The stretch of time between the cutting in and cutting out of the switch should be determined by using stop-watch.

d) Set the driving voltages on the instruments " УН курса - 4 v. ("КС - справа ") and on the instrument "УН высоты" -0 v. by the use of knobs "ампл.мод.напр." and " фаза " of the unit K-101M.

e) Disconnect the cable N 27 from the unit K1-5MP plug N 27. Connect the oscillograph in the single sweep regime to the unit K1-5MP monitoring jack "C.F.e. signal"; the oscillograph must be triggered by means of unmodulated pulses from the unit K-101M socket " ВЫХОД П"

f) Turn the unit K-101M knob " фаза " until sequence of the pulse tops forms a straight line or a trapezium appears with an amplitude decreasing from left to right. Fix readings in grades (α_1) against vernier zero mark when the phase-shifter scale is in this position.

g) Disconnect the oscillograph from the unit K1-5MP monitoring jack "C.F.e. signal"; attach the cable N 27 to

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the socket N 27; by turning the unit K-101M knob "фаза" set the driving voltage " УН ВЫСОТЫ" on zero; in this case the driving voltage "УН Курса " must correspond to the position "КС - сирена".

Fix readings in grades (α_2) on the phase-shifter scale for the second time.

h) Difference between α_1 and α_2 determines the phasing error, 4 expressed in grades.

Phasing error must not be higher than 6 grades.

Note: If "A" regime phasing error does not keep within the abovementioned tolerances, but is no more than $\pm 15^{\circ}$, it's permitted to re-adjust by the use of the potentiometer "reference voltage phase" of the unit K1-6M in accordance with the Procedure, item 8.

The checking of the angle between the axes of co-ordinates must be carried out using the range potentiometer, positioned on the 120 th second and in the following order:

a) Set the following driving voltages:

course channel - 4 v

elevation channel - 0 v.

The setting should be realized by the use of the knobs " ампл.мод.изир." and " фаза " of the unit K-101M

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in accordance with the readings of the board K-109 instruments " УН курса " and " УН высоты ". Register phase-shifter scale readings.

b) Set driving voltages alternatively in the positions "КС вниз ", "КС слева " and "КС вверх " so that the driving voltage of the channel should be every time equal zero. The setting should be carried out by turning the unit K-101M knob " Азим " in accordance with the readings of the board K-109 instruments " УН курса " and " УН высоты "

c) Differences in readings of the phase-shifter scale for adjacent positions determine angles between the axes of co-ordinates. The angles between the axes of co-ordinates should be kept within $90^{\circ} \pm 6^{\circ}$.

Note: If angles between the axes of co-ordinates, measured by means of two different K-100M equipment sets, don't keep within abovementioned limits, but keep within $90^{\circ} \pm 10^{\circ}$, it's permitted to readjust by using the unit K1-6M potentiometer R147 which can turn the axis "Z" by $\pm (4^{\circ} - 5^{\circ})$.

Switch off the Rader.

10. Checking of the pulse delay, frequency and power of the responder.

The checking of the responder pulse delay consists in

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measuring the responder pulse delay relative to the main output pulses from unit K1-6M.

To check it's necessary to:

a) Set the following attenuations:

for the attenuators N 1, 2, 3 and 4 - 0 db;

for the attenuators N 5 and N 6 - max.

Set the oscillograph in the sigle sweep regime and trigger it by the pulses from the unit K-101M socket " ВЫХ.МОД. "

Turn the knobs "ампл.мод.напр." and "задержка ручн." of the unit K-101M to the left as far as it will go.

b) Give pulses from the unit K-114M (dipole antenna and detector) installed in front of the antenna K1-11, to oscillograph input.

c) Set the unit K-101M knob " модуляция " in the position "ВЫКЛ" and the knob " прибор " in the position "Ч.М." Set the P.M. percentage equal 1,1% by means of the knob "ампл. от 0°; 90° и глубина "ЧМ"and in accordance with the unit instrument readings.

Set the toggle switch "responder" of the unit K1-13M in the position "on".

d) Switch on the Radar.

e) Connect the cable N 28 to the unit K1-6M socket and in 15 minutes after switching on the Radar, measure responder

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pulse delay by using 10 sec. calibration marks of the oscillograph (see Fig.N 2). The initial pulse delay of the responder should be 170 ± 20 sec.

Set the toggle switch " КОМ.2 " of the K-109 board in the position "ВНЕШН. "; unit K1-12MP output pulse must travel, in this case, to a sweep beginning (see Fig.N 4).

Initial pulse delay of the unit K1-12 MP must be no more than 10 sec. (see Fig.N 5). Set the toggle switch " КОМ.2" in the position " ВНУТР.".

f) In turning the knob "АМПЛ.МОД. НАПР. " to the right, pulse on the oscillograph screen should "spread" (see Fig.N 3).

g) Switch off the Radar.

h) Prepare the instruments "ВСТ-10" and "ИМИ-10М" for the operation in accordance with the Operating Instruction".

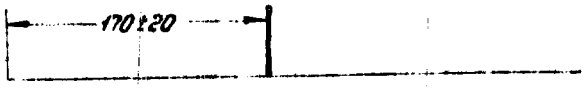

Fig.2

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Fig.3

Fig.4

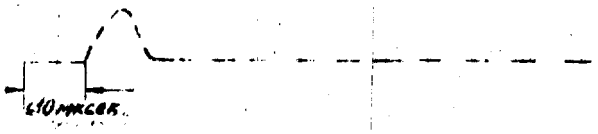

Fig.5

1) Switch on the Radar and measure the responder frequency in accordance with the BCT-10 Operating Instruction.

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j) Switch off the Radar.

k) Disconnect the cable N 31 from the unit K1-12MP socket. Connect a special cable (forming part of the set K-100M) to the unit K1-12MP socket. The other end of this cable must be connected to the instrument MM-10M through additional attenuators.

l) Switch on the Radar and measure the responder power in accordance with the " MM-10M" Operating Instruction. Take in account attenuation of the additional attenuators and cables.

m) Switch off the Radar.

Responder frequency and average power must be " ±8 Mc" and no less than 180 mW relatively.

n) Disconnect the special cable from the unit K1-12MP socket N 31 and connect the cable N 31 to the socket N 31.

o) Disconnect the cable N 28 from the unit K1-6M socket.

p) Set the toggle switch "responder" of the unit K1-13M in the position "off".

Note: When switching on the unit K1-12MP it's necessary to age the tube TM -135 in correspondance with the Istruction given in the Appendix N 4.

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§ 8. Equipment preparation for the parameter regime "B" checking

To check the "B" regime parameters it's necessary to:

a) Connect the equipment units in accordance with the block-diagram (see Appendix N 2); set the unit K1-13M toggle switch "antenna" in the position "on".

b) The position of the unit K-101M control knobs, as well as knobs of the board K-109 and of the unit K1-13M must correspond to the positions, indicated by the items 1,2 and 3 § 6, except the switches "ТОК КРИСТАЛЛА" and "АРУ" of the board K-109, which must be set in the position "Б".

c) Switch on the equipment following the sequence, indicated by the items 5 and 6 § 6.

d) Disconnect the cable N 26 from the unit K1-6M and, using a special cable forming part of the K-100M set, give pulses from the unit K-101M socket "ВНХ.СИНХР." to the socket N 26 of the unit K1-6M.

e) Set the radar-tester 31- ИМ pulse delay within 80÷100 μsec using the unit K-101M knob "задержка ручная"; the switch "прибор" must be set in the position "ДАЛЬН.".

f) Set the unit K-101M switch "прибор" in the position "ЧМ", and set the percentage frequency modulation of the

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video pulses on the level of 1.1% by means of the knob " АМПЛ. ОН 0°, 90° and " ГЛУБИНА ИМ " in accordance with the unit instrument.

g) Switch on the Radar following the order, indicated by the item 11 § 6.

h) Set the following attenuations:

for the attenuator N 1 - 15 db

for the attenuators N 2 and N 4 - 0 db

for the attenuators N 5 and N 6 - max.

The attenuation value of the attenuator N 3 must be set in following way:

- increase the attenuation up to the AFC stopping threshold;
- decrease the attenuation by 4 db against the AFC stopping attenuation.

i) Give pulses from the unit K1-9M socket "Strobe" to the oscillograph input. Set the oscillograph in the single-sweep regime.

The oscillograph triggering should be carried out by means of pulses from unit K-101M socket "ВЫХОД СИНХР.Л "

j) By moving the unit K-104M antenna on the horizontal and vertical planes, set it so that geometrical axes of the antennae of the units K-104M and K1-7M should be brought in line.

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§ 9. Checking procedure of the regime "B" parameters

1. Search period checking of the range unit (autoselector K1-9M).

The search period checking consists in measuring the time, during which the unit K1-9M strobe runs all over the search range.

To check it's necessary to:

- Using a stop-watch measure time, necessary for 10 complete sweepings of the strobe pulse.

- Determine the unit K-9M autoselector search period using the formula:

$$T = t/10$$

where: T - autoselector search period, expressed in sec.

t - time, (sec.), during which 10 sweepings of the strobe-pulse take place.

- The search period must be within 2,0 ÷ 4,0 sec.

2. Checking of the regime "B" interlocking time.

The checking of the regime "B" interlocking time consists in determining the time, passed since a moment of the drop command initiation to a moment of the command N 2 initiation (timing should be carried out from the start position of the

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range potentiometer "ПД").

To check it's necessary to:

a) Cut in the board K-109 toggle switch "КОМ.ОТЦ." and puch simultaneously a stop-watch.

b) Set the attenuation of the attenuators N 5 and N 6 equal 0 db.

c) Stop the watch in the moment of lighting up of the indicating lamp "КОМ. N 2". If the command N 2 interlocking time checking is carried out after checking the "A" regime parameters, it must be taken in acount that time-motor have been set on the 120-th second position.

d) Cut out the toggle switch "КОМ.ОТЦ." after setting the range potentiometer in the "end position" (the board K-109 indicating lamp "КОНЕЦ ПД " is lit up).

The interlocking time must be within 200 ± 8 sec.

3. Checking of the "memory" time, lock and unlock sensitivity of the relay, commutating to "B" regime (command N 2)

The checking of the "memory" of the relay, commutating to "B" regime (command N 2) consists in measuring the time lapse between the "B" antenna input signal switching off and the command N 2 switching off.

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The checking of the lock and unlock sensitivity of the relay, commutating to "B" regime (command N 2) consists in measuring the U.H.F. signal minimum power, which provides reliable locking on of the command N 2 and in measuring the maximum power, which provides reliable unlocking of the command N 2.

To check it's necessary to:

a) Set the antenna K-104M in the antenna K1-7M equisignal zone by moving the antenna K-104M along the co-ordinate axes until board K-109 instruments "УН курса" and "УН высоты" readings became equal to zero.

b) Feed pulses from the unit K1-8M minitoring jack "error signal" to the oscillograph input by using a cable.

c) Set the percentage modulation on the level of 90% by moving the antenna K-104M upward. Figure on the oscillograph screen must be the same as one of the Fig.N 6.

d) Disconnect the cable from the unit K1-8M monitoring jack "error signal" and connect it to the unit K1-9M monitoring jack "strobe".

e) Set the attenuation of the attenuator N 6 on the level of 10 db; maximize sharply attenuation of the attenuator N 5 and simultaneously start the stop-watch. Stop the watch when the unit K-109 indicating lamp "КОМ.№ 2" goes out.

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Fig.6. Pulse from the unit K1-8M monitoring jack "error signal".

The command N 2 "memory" time must be within 3 ± 1 secs.

f) Decrease smoothly the attenuation of the attenuator N 5 till the indicating lamp "KOM.N 2" is lit up.

Note: Attenuation of the attenuator N 5, [illegible] it is near the command N 2 locking limits, must be decreased by one [illegible] division steps; each step should be [illegible] after two or three strobe search [illegible]

g) Determine the command N 2 locking sensitivity, [illegible] in "dbm", as a sum of attenuations (expressed in "db") attenuators N 1,2,5 and 6, of the "B" UHF channel of [illegible]

Form [illegible] [illegible]

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K-100M equipment and of the Radar K-1M.

The command N 2 locking sensitivity must be within 75 ± 81 dbm.

Note: 1. With a view to obtain more accuracy of the command N 2 locking sensitivity measurements it's necessary to set the unit K1-9M accumulator zero voltage preliminarily following the procedure: increase the input signal, until the Radar is commutated into the regime "B" and the strobe is stopped. Then decrease the signal sharply. In this case the strobe-pulse must remain in the locking on position during the "memory" time.

If the strobe moves to the right, turn the unit K1-9M potentiometer "Accumulator voltage" counter-clockwise till this movement disappears.

When the strobe moves to the left, the potentiometer "Accumulator voltage" should be turned clockwise.

2. If the command N 2 locking sensitivity, measured by two different K-100M equipment sets, is not kept within the above mentioned limits, but is kept within the 73÷84 dbm, its adjusting is permitted by means of the unit K1-8M potentiometer "M.G.C.".

3. The "B" U.H.F. channel of the equipment K-100M and the Radar K1-M consists of the waveguide triplet, the attenuators N 5 and N 6, the K-104M antenna together with the cable, the air channel between the two antennae K-104M and K1-7M and the antenna K1-7M.

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4. The attenuation of the "B" U.H.F. channel must be carried out folliwing the procedure:

a) Disconnect the antenna K-104M cable from the adapter N 1, which is connected with the attenuator out-put flange.

b) Interconnect the adapter N 1 and the attenuator using the unit K-103M3 special cable.

c) Measure the command N 2 locking sensitivity in accordance with the item N 3 § 9, but the percentage modulation should be set 0%.
The metering must be carried out by means of the attenuators N 5 and N 6 only.
The U.H.F. air channel attenuation must not be taken in to account. In measuring, the attenuation of the attenuators NN 1,2,3,4 must remain constant.

d) Disconnect the cable N 2 output flange from the antenna K-104M cable and connect it to the unit K1-4bM mixer input. As a preliminary disconnect the flexible waveguide from the unit k1-7M mixer.

e) Repeat the item "c" measurement.

f) Sum difference between attenuator N 5 and N 6 readings, obtained in measuring by the items "c" and "e", determines the U.H.F. air channel attenuation.
To obtain the overall "B" U.H.F. channel attenuation (the "γ" - value) it is necessary to add the 3 db attenuation of the waveguide triplet to the above mentioned value.

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5. The attenuation determinations should be carried out monthly at least by means of thrice-repeated measuremets using 3 objects "KC". The average arithmetical value must be considered its actual value. This value is to be registered in the Radar K-1M parameter test book (see Appendix N 1).
If there are not 3 objects "KC" withdrawn from storage, it's allowed to carry out the above-mentioned measurements using two objects "KC".

6. To check the command N 2 unlocking sensitivity, it's necessary to:
increase the attenuator N 5 attenuation until the indicating lamp "KOM.N 2" goes out. The increasing should be realized by one half attenuator scale division steps, each step should be made after the 3 ÷ 4 sec. time delay.
The command N 2 unlocking sensitivity, expressed in "dbm", is determined as a sum of attenuations (expressed in "db") of the attenuators NN 1,2,5,6 and the "B" U.H.F. channel of the equipment K-100M and the Radar K1-M.
The command N 2 unlocking sensitivity must be "worse" than the command N 2 locking sensitivity by 6 db or less.

4. Checking the echo-signal locking and tracking ranges

The checking consists in determining an echo-signal delay range in which the autoselector commutates from the

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searching regime into the tracking one and operates in this regime stable.

To check it's necessary to:

a) Set the following attenuations:

- for the attenuator N 1 - 15 db,
- for the attenuators NN 2,4,5,6 - 0 db.
- for the attenuator N 3 - by 3 ÷ 4 db less than it's necessary for the A.F.C. "sawtoothing".

b) Set the unit K-101M switch " СКОРОСТЬ " in the position " ОБЗОР". Set the knob " ЗАДЕРЖКА-АВТОМАТ " in the position " БЛИЖЕ ".

c) Set the unit K-101M switch "ЗАДЕРЖКА " in the position " АВТОМ. ".

Set the switch " СКОРОСТЬ " in the position "ОБЗОР ", when the delay time of a pulse is 150 sec; the delay time must be determined by means of the unit K-101M instrument scale.

d) Measure the pulse delay value in the moment when the autoselector is commutated from the searching regime into the tracking one by means of the 10 sec marks of the oscillagraph. When commutated into the tracking regime, the probe-pulse starts moving slowly in the range decreasing direction.

e) Decrease the pulse delay speed down to 0,3÷0,6 μsec/sec

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by means of the unit K-101M knob "ЗАДЕРЖКА-АВТОМАТ" when the pulse delay becames equal to 5 ÷ 10 sec.

f) Measure the pulse delay value in the moment of commutating the autoselector from the trucking regime into the searching regime by means of the oscillograph calibration marks. The commutating must be fixed as a strobe-pulse searching initiation on the oscillograph screen takes place.

g) Set the unit K-101M knob ЗАДЕРЖКА - АВТОМАТ in a position "ДАЛЬНО", after the autoselector have been passed to the search regime. When the autoselector commutates into the tracking regime, measure the time delay value by means of 1 sec marks of the oscillograph.

The locking on range must be within 17 ± 4 sec to 120 ± 20 sec.

The tracking range must be within 120±20 sec to 1.6 ± 1 sec.

Note: An adjusting by the unit K1-9M potentiometer "search starting" is allowed, when the lower range limit does not keep within the above mentioned tolerance but is less than 17 ± 7 sec.

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5. Checking of the "B" phasing error and "B" driving voltage transconductance

The checking of the B-regime phasing error consists in determining horizontal and vertical components of the driving voltages, when the antenna K-104M deviates from the antenna K1-7M equisignal line in vertical or horizontal directions.

The checking of the driving voltage transconductance consists in measuring a driving voltage value, when the antenna K-104M deviates from the antenna K1-7M equisignal line by 1^{o}.

To check it's necessary to:

a) Check the missile "KC" placing, which must be made in accordance with the item "g" § 4.

b) Set the unit K-101M switch "Задержка" in the position "ручная". Set a delay time of the radar-tester 31-MM triggering pulses equal to 80 ÷ 100 sec, using the unit K-101M knob "Задержка".

c) Set max. attenuation of the attenuators N 5 and N 6.

d) Set the board "K-109" switch " КОМ. N 2" in the position "ВНЕШ. ".

e) Balance the regime "B" driving voltages using the unit K1-6M potentiometers "Balance Y" and "Balance Z" and the

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board K-109 instruments "УН курса " and "УН высоты ".

f) Set the board K-109 switch "Кам. 2" in the position "Внутр." and check that the regime "A" driving voltage unbalance is less than ± 0.25 v.

g) Set the mixer "B" input signal on the level of -45 ÷-50 dbm.

h) After the autoselector looks on the echosignal, set the antenna K-104M in the antenna K1-7M equisignal zone by moving the K-104 antenna till the readings of the board K-109 instruments "УН курса " and "УН высоты" become equal zero.

i) Deviate the K-104M antenna from the equisignal position by 50 mm up, down, to the right, to the left in sequence. In that case the readings of the board K-109 instruments "УН курса " and "УН высоты " must be within the limits shown in the table N 1.

j) Switch off the Radar.

The phasing error and the transconductance of the driving voltages are within the tolerances if results of measurement are within the limits, menshioned in the table N 1.

Note: If the phasing error is not kept within the above-menshioned limits (i.e. more than 1 v), it is permitted to adjust it by means of the unit K1-7M reference generator stator rotating screw.

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Table N 1

NN	Direction of antenna K-104M deviation (along the "KC" course line)	Readings of the instrument "УН курса"	Readings of the instrument "УН высоты"
1.	50 mm above	in ang. direction less than 1 v	"КС вниз" 4.25 ÷ 5.75 v
2.	50 mm below	in ang. direction less than 1 v	"КС вверх" 4.25 v ÷ 5.75v
3.	50 mm to left	"КС справа" 4.25v ÷ 5.75v	in any direction less than 1 v
4.	50 mm to right	"КС слева" 4.25v ÷ 5.75 v	in any direction less than 1 v

6. Checking of the network coupling the Radar K1-M with the autopilot A K-5B-K and the mother-ship equipment

The checking consists in verifying the networks, coupling the Radar K-1M with the autopilot A K-5B-K and the object "KC" with the mother-ship.

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To check it's necessary to:

a) Connect the board K-109 plug Ш-2 cable to the object "КО" triplet ГК-63 plug connection (having 26 pins), the board K-109 plug Ш-3 cable to the unit K-101M in accordance with the block-diagram (Appendix N 2).

b) Set the range potentiometer "Ш" in the start position.

c) Set the attenuations of the attenuators NN 1,2,3,4,5 and 6 equal zero.

d) Disconnect the unit K-101M cable from the unit K1-6M socket N 26 and connect the unit K1-5МР cable N 26 to the latter.

Disconnect the cable N 25 from the unit K1-6M.

e) Set the unit K-101M knob "прибор" in the position "вход ФВ "

By turning the knob "ВХОД ФВ " set the voltage 60v in accordance with readings of the unit instrument.

f) Deviate the antenna K-104M along the axes (Y and Z) by 50 mm from the equisignal zone. (The equisignal position of the antenna K-104M must be fixed preliminarily on the scales of movment.

g) Switch on the Radar and set the board K-109 switch "режим контроля" in the position "режим А - баланс"

h) After heating the Radar, the board K-109 instrument

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"ОН А/б " must have a stable reference voltage readings within 2,8 ± 1,2 v. and the pointers of the instruments " УН курса " and " УН высоты " must indicate a driving voltage value, which is no more than ±0,25 v (Allowed unbalance of the driving voltage).

i) Set the switch " рек.контроля " in the position " режим А - управления".

j) Provide the driving voltages no less than 3 v by means of the unit К-101М knob " вып.мод.напр." in accordance with the board К-109 instruments "УН курса" and "УН высоты".

In turning the unit К-101М knob " фаза " values and polarity of the driving voltages must vary.

k) push and release the board К-109 button " ком.I внеш." When pushing the button the indicating lamp "ком.I" of the board must be lit up, and driving voltage values must not vary more than by 0,5 v.

l) Set the switch " рек.контроля " in the position "режим Б-ближнее".

In the instance the indicating lamp " ком.I " of the board К-109 must be lit up. The instrument " контроль ОН " must indicate a driving voltage value within 2,8 ± 1,2 v. and the pointers of the instruments " УН курса " and " УН высоты " must be on zero divisions. When there is an unbalan-

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cing, it's necessary to carry out the balancing by using the unit K1-6M potentiometers "Balance Y" and "Balance Z".

m) Set the switch "реж.контроля " in the position " режим B-управления".

In this case the lamp " ком.2 " must be out firstly and then it must be lit up again 3-4 sec.later. When the indicating lamp becomes lit up, the instruments " УН курса and " УН высоты " must indicate presence of the "B" driving voltages. When the antenna K-104M moves, values and polarity of the driving voltages are to vary.

n) Set the switch " реж.контроля " in the position " режим A - управлен.". Set the driving voltages equal to 5 v and corresponding to the position "КС слева " and "КС внизу ". The setting must be done by turning the unit K-101M knobs " ампл.мод. Д." and " фаза " and in accordance with the board K-109 instruments " УН курса" and " УН высоты".

Switch on and engage the autopilot A K-5B-K. After carrying out the command push the board K-109 button " ком. 1 внеш.".

The object "КС" rudders must deflect to the right and up.

Release the button " ком.1 внеш."

o) Set the board K-109 switch " реж.контроля" in the position "режим B-управление".

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Move the antenna K-104M on the horizontal and vertical planes until, the readings of the board K-109 instruments "УН курса " and " УН высоты " will be equal to 5 v. and will correspond to the position "КС справа " and "КС слева " push the button "ком.I внеш." , The "КС" rudders must deflect to the left and down. Release the button "ком.I внеш.".

p) Set the switch "реж.контроля" in the position "режим А - балансировка " and switch off the Radar by means of the board K-109 switch " питание станц. " and the unit K1-13M switch "Radar" (станция).

q) Connect the cables N 28 and N 25 to the unit K1-6M.

r) Switch off all the instruments and disconnect the feeding cables of the "КС" and the power-supply set, from the power supply.

s) Disconnect all the set K-100M cables from the object "КС".

t) Close the top body hatch, located between the frames N 1 and N 3 and bottom body hatch, located between frames N 3 and N 6, and the top fin dome hatch.

Изменения | Разработал | Утвердил гл. инженер
Инв. № подл. | Подпись и дата | Взам. инв. № | Проверил | Технолог | Н. контр. | Нач.
Регистр. № | Срок введения | Дата регистр. | № приказа
Ф. XV

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CHAPTER III

§ 10. CHECKING OF THE JOINT OPERATION OF THE RADAR K-1M AND K-11M, WHEN THE "KC" IS SUSPENDED

§ 10. The checking of the joint operation of the Radars K-1M and K-11M, when the "KC" is suspended, has for an object to verify the tuning of the Radar K-1M at the Radar K-11M.

The checking is to be carried out from the navigator-bombardier's cabin. Commands are transmitted to the Radar K-11M operator by means of the interphone system.

Note: 1) Car traffic and walking near the antennae of the Radar K-11M and K-1M are prohibited during the checking.
2) Only personnel participating in the checking of the equipment is allowed to be in the area during the checking.
In checking the right suspention the right fold of the rear bomb door must be closed.
In checking the left suspention the left fold of the rear bomb door must be closed.

To check it's necessary to:

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a) Open the bottom body hatch between frames 3 and 6. Set the toggle switch "Station" of the unit K1-13M in the position "on".

b) Set the board "DK-17M" switch "Monitoring" in the position "right" or "left", depending on side, where the object "KC" is suspended; set the switch "Monitoring regime" in the position "Regime A - balancing".

c) Cut in the missile-borne power source by switching on the toggle switch "System supply" and 10-15 minutes later the toggle switch "K-1M" and "Autopilot" which are located on the bombardiers left board; in this case the Radar K-1M is to be switched on and the following indicating lamps must be lit up:

the lamps "KC suspended" and "K-1M and Autopilot" on the bombardiers left board;

the lamps "K-1M" switched on", "start signal of range potentiometer", "command N 2" (the latter is to be gone out some seconds later).

d) 5 minutes before checking the Radar K-1M initiate the command to the Radar K-1IM operator: "Provide the monitoring regime for the right (left) side". The Radar K-1IM should be heated during 10 minutes.

e) The instrument "reference voltages" of the DK-17M must indicate stable reference voltages equal 1,2 ± 2.8 v. no later than 5 minutes after cutting in the toggle switch "K-1M" and "Autopilot".

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f) A signal responder pulse must appear at the 25 km mark of the Radar K-IIM tracking indicator screen.

g) If the pointers of the driving voltage instruments are trembling heavily (when a reliable frequency locking takes place) initiate the command "Readjust the Radar K-IIM antenna by reaching a minimum responder pulse "wash out" to the operator.

h) Switch off and 30 secs. later switch on again the Radar K-IIM; check reliability of the frequency locking on with the A.G.C. by using stability of the reference and driving voltages as a criterion.

i) Initiate the command "Switch off and switch on again the transmitter" to the Radar K-IIM operator.

In switching off the transmitter check commutation of the A.G.C. into the search regime by using reference voltage fluctuations as a criterion, and in switching on the transmitter check reliability of the frequency locking on.

j) Set the switch "Monitoring regime" in the position "Regime A - Guidance". The driving voltage instrument must indicate in this case stable driving voltages, each equal to 6 ± 2 v.

A "washed out" pulse must appear at the 25 km mark of the Radar K-IIM tracking indicator screen.

Note: 1) If in setting the switch in this position the AFC stops its operation, initiate the command "Decrease the output amplitude of the "RC"

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generator" to the Radar K-1IM operator.

2) If only one of the driving voltages does not keep within the above-mentioned limits, initiate the command "Adjust the amplitude and phase of the "RC" generator output voltage" to the Radar K-1IM operator

k) Push and release the knob "exterior command N I" of the board "DK-17M". In pushing the knob the lamp "command N 1" must lit up. The driving voltage values must not be changed more than by 0.5 v.

1) Set the switch "Monitoring regime" in the position "Regime B - Balancing"; the lamp "command N 2" of the board DK-17M must be lit up in this case. Pointers of the driving voltage instruments will indicate an unbalance of the Radar K-1M driving voltages; the unbalance must not be more than ± 0.25 v.

Reference voltage value indicated on the instrument "D.V. monitoring" must be within limits 1.2 ÷ 2.8 v.

A signal responder pulse can be seen at the beam start or be absent on the Radar K-1IV tracking indicator screen.

m) Set the switch "Monitoring regime" in the position "Regime B - Guidance"; the lamp "command N 2" goes out in this case and 3-4 secs. later is lit up again. When the lamp "command N 2" of the instruments "course driving voltage" and "elevation driving voltage" is lit up simultaneously

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driving voltages must appear, value and polarity of which must vary in turning the Radar K-IIM antenna slightly. No responder pulses will be seen on the Radar K-IIM tracking indicator screen.

n) Set the switch "monitoring regime" in the position "Regime A - Balancing". The lamp "command № 2" must be gone out 2 secs. later.

o) Repeat the operations, indicated in the items "m" and "n" twice.

p) Initiate the command "switch on the antenna exiter rotation" to the Radar K-IIM operator. In switching the pointers of the instruments "course driving voltages" and "elevation driving voltages" will swing smoothly and the pulse will be "washed out" on the Radar K-IIM tracking indicator screen.

q) Repeat the operations indicated in the items "m" and "n" twice, when the exiter is rotating.

r) Initiate the command "Set the toggle switch "wobbulation" in the position "operation" to the Radar K-IIM operator. After switching the toggle switch reference voltage value must be kept within the limits 1.2 ÷ 2.8 v; the instruments "course driving voltage" and "elevation driving voltage" must indicate driving voltages, value and polarity of which must vary in turning the Radar K-IIM antenna slightly.

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a) Inquire of the Radar K-IIM operator if the responder operation is well. After his "all right" initiate the command "Monitoring of the suspended "KC" is over" and switch off the power supply of the object "KC" by means of the toggle switches "K-IM" and "Autopilot" and "System supply".

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CHAPTER IV

RADAR K-1M BENCH CHECKING

§ 11. Additions to the general tenets of § 4

a) Spare Radar K-1M parameter checking must be carried out on bench.

b) The Radar power supply is provided with the motor-alternators MA-250M and MA-500M, which are to be connected to the unit K1-13M by means of the additional cables of the set K-100M.

c) The unit K1-1M is to be connected directly to the unit K1-4aM by using a special waveguide of the set K-100M.

d) The antenna A1-7M should be installed on the bench so that it should not be rolled about the equisignal line.

To install the antenna it's necessary to bring in line the upper and lower lugs of the antenna reflector edges with a plumb.

§ 12. Radar K-1M parameter checking program

The Radar K-1M parameter checking on bench must be carried out following the program, expounded in the chapter V, § 5, except it.1.

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§ 13. Equipment preparation for the "A" parameter checking

To check the "A" parameters interconnect the equipment in accordance with the block-diagram (see appendix N 3). The general capability checking of the Radar K-1M must be carried out according to § 6 with the exception of:

1. The board K-109 switch "autopilot equivalent" (эквивалент АП) should be set in the position "on" ("вкл.").

2. Connect the cables of the power supply set "АП", which feed the equipment K-100M and connect the cables of the motor-alternators MA-500M and MA-250M, feeding the Radar K-1M and connect the cable of the unit K1-13M plug connection "Ш -14".

§ 14. "A" parameter checking procedure

"A" parameter checking must be carried out according to the procedure, expounded in § 7.

In checking § 7 items 3, 5, 7 don't take in account attenuations, caused with the unit K1-3M.

§ 15. Equipment preparation for "B" parameter checking

Equipment preparation for "B" parameter checking is to be carried out in accordance with § 8.

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The equipment interconnection must be carried out according to the block-diagram (see appendix N 3).

§ 16. "E" parameter checking procedure. "B" parameter checking must be carried out following procedure, expounded in § 9.

In checking § 9 item 6 it's necessary to:

a) connect the board K-109 plug Ш-2 cable to the unit K1-13M socket Ш-11 through the triplet PK-63.

b) Do not check the second parts of the subitems "a" and "e".

c) The board K-109 switch "autopilot equivalent" ("эквивалент АП ") should be set in the position "on" ("вкл").

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CHAPTER V

OPERATION OF THE RADAR K-1M AT LOW TEMPERATURES

In installing the Radar K-1M in the object "KC" under conditions of low temperatures and raised humidity, it's necessary to give particular attention to a possible presence of moisture drops, snow and ice in the plug connectors, in the places, where the units are installed and the mettallization elements are fixed; particular attention must be given also to a reliability of the electrical contacts of the MA-500M and MA-250M feed wires as well as to a lubrication condition of the unit K1-7M parts.

The installation of the units in the object "KC" after transporting it from a heated room to a cold room must be carried out only when the moisture is fully dried up.

The measuring of attenuations of the cables, forming part of the K-100M equipment set and of the air space between the antennae K-104M and K1-7M, must be carried out immediately before measuring sensitivity of the Radar channels.

Measured the cable attenuations their position may be changed only within the limits, which are specified by the

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appropriate methods, since the attenuation of the cables depends on the temperature and changes with cable position changing.

Radar K-1M frequency measurement must be carried out by the use of the 31-M and in accordance with the 31-M Operating Instruction (2 or 3 times after operating the transmitter during 10 minutes).

In checking the Radar K-1M parameter, measurements of the sensitivity of the channels A.F.C., synchronisation, error signal, driving voltage transconductance as well as looking and tracking ranges must be carried out 2 or 3 times.

Note: Before measuring the parameter, the radar-tester should be heated during 40-45minutes.

If range values differ sharply from the specified data or values, obtained at positive temperatures, the parameters must be measured by means of another oscillograph of under normal conditions.

Before transporting the object "KC" to be suspended it's necessary to bolt tightly the top hatches of the nose block and tail pod, giving particular attention to the rubber gasket safety.

It is not advisable to open the hatches except cases of emergency.

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To heat the unit K1-12MP after suspension it necessary (on the ground and in the air) to cut in the switch "НАГРЕВ ОКУЛЯРА" 10-15 minutes before switching on the Radar to heat.

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CHAPTER VI

STORAGE, PACKING AND UNPACKING OF THE RADAR K-1M

§ 17. Storage of the Radar K-1M

1. It's permitted to store the Radar K-1M:

a) in an object "KC" is kept alert in the open air and is covered with a tarpaulin;

b) in an object "KC" covered with a tarpaulin, under usual hangar conditions;

c) in an object "KC", when it is laid up together with the object;

d) being partly dismounted from an object "KC", in a sealed package or on storage shelves in a specially prepared room;

e) as an assembled system, which was not installed in an object before, in a sealed package or on storage shelves in a specially prepared room;

f) in the form of separate units, in sealed packages together with the framework (SPS - 1:50) or on storage shelves in a specially prepared room.

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Перечт. №
Дата перечта
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Note: Before installing the Radars and units, which have been stored on shelves, it's necessary to blow them through by using dry compressed air.

2. In all the cases, mentioned in the item 1, except the cases "a" (and "b"), it's permitted to store the equipment in ventilated rooms, in which the temperature is kept within +5° ÷ +10°C and the relative humidity is no more than 80 percent. When storing it in sealed peckages the relative humidity up to 85 percent is allowed. The storage of the equipment together with the poisonous substances, acids and alkalis etc. is not allowed.

Note: The spare parts of the Radar must be stored under the same conditions, but in all the cases without sealing.

3. In storing the Radar K-1M in the object "KC" which is covered with the tarpaulin in the open air, storage time is not allowed to be more than 7 days.

4. In storing the Radar K-1M in the object "KC" covered with the tarpaulin under usual hangar conditions, it's permitted to store during 6 months.

5. In storing the Radar K-1M in the object "KC", when it is laid up together with the object, in the sealed package

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or on the shelves in the specially prepared room, it's permissible to store it during 12 months from the date of arrival to the port of destination.

6. When the Radar is to be partly dismounted and stored over a long period of time, it's necessary to take the following equipment from the object "KC": framework together with the units K1-4 aM, K1-4 M, K1-5MP, K1-6M, K1-8M, K1-9M, K1-10M and coaxial cables, as well as the unit K1-12MP; the equipment must be packed in accordance with the § 18 of this Instruction. The rest of the units must be kept in the object and laid up together with the latter in accordance with the Instruction N KC-05-HK; in this case:

a) flanges of the waveguides of the units K1-3M and K1-7M must be plugged;

b) flexible waveguides of the units K1-3M and K1-7M must be installed in the handling framework model;

c) the unit K1-13M plug connectors should be fastened in the handling framework model;

7. When separately completed Radars are to be stored over a long period of time, the units K1-1M, K1-7M, K1-11, K1-12MP, K1-13M as well as the cable set and the frameworks together with the unit K1-4aM, K1-4dM, K1-5MP, K1-6M,

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K1-8M, K1-9M and K1-10M must be packed in a sealed packages in accordance with the § 13 of this Instruction.

The moter-alternators MA-500M and MA-250M should be stored in accordance with the Instruction, pertinent to the laying up, the long term storage and the withdrawing from storage (see Appendix N 9).

The unit K1-3M and its sealing flanges (with which it is delivered by the manufacturer) must be stored in a packaging case.

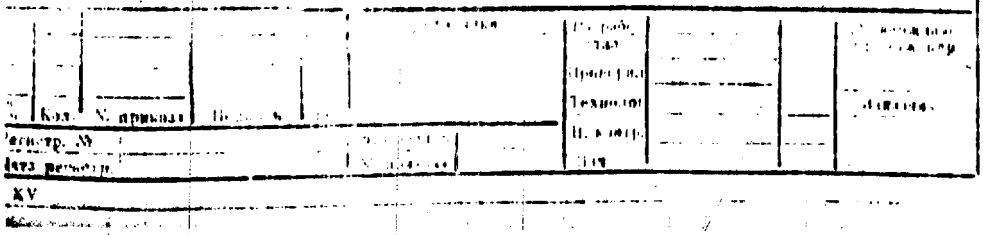
8. It's permissible to store the Radars K-1M in usual packages

a) in a storehouse of the K-1M manufacturer during 3 months after having been recepted and until they are to be delivered to the object "KC" manufacturer.

After storing during one month, equipment delivery must be allowed on condition that it will be checked once more in accordance with an agreed program.

After three months storage, a repeated checking must be carried out following the complete program and in accordance with the technical requirements of the equipment K-1M; fitness term and operation life must be prolonged;

b) in a storehouse of the object "KC" manufacturer during 3 months after delivery.



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§ 18. Packing and unpacking of the equipment K-1M

1. The packing of the equipment must be carried out under normal storehouse conditions at the temperatures within +5 ÷ 40° and at the relative humidity up to 80 percent. A package has to correspond with forthcoming storage features, specified in the Table N 1 of this paragraph.

Note: Equipment, which is stored at negative temperatures before packing, must be subjected to a drying during 12 hours under conditions, specified in this item.

2. The packing of the equipment must be carried out in accordance with a packing list, in which should be registered packed unit marks (see Table N 1), unit numbers and quantity of units are to be packed.

The packing list should be drawn up in duplicate for each package and in accordance with the form, valid for the storehouse. The packing list is to be filled in by the Organization, which carries out the packing. One copy of the packing list must be in the packing case and the other is to be in hands of the Organization, which carries out the packing.

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Table N 1

Unit name	Unit mark	Package drawing NN		Storage without sealing
		Long term storage		
		Sealed	Packing	
A. Completed Radars				
1. Framework with its units	KP-000	И-320226Гр	И-320211 Гр.	1А.750.000
2. Unit K1-1M	KP-010			1А.750.030
3. Unit K1-3M	KP-030			
4. Unit K1-7M	KP-070	-	-	37-Я - С65
5. Unit K1-11	KP-110			2121-К
6. K1-12MP	KP-120	И-3202205Гр	И-320212Гр	1А.750.010
7. Unit K1-13M	KP-130			1А.750.020
8. Cable set	KP-140	-	-	1А.750.020

Note: If the packing is carried out at the Radar K-1M manufacturer's plant or at the object "KC" manufacturer's plant, the packing list must be drawn up in triplicate.

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1. Packing procedure - sealed packages

3. Ordinal numbers and marks of the units are to be put down in the packing lists.

4. Moisture absorbing tubes in the sealed boxes must be opened. With that end in view pull out spacing rings, take out perforated cups and gauze napkins with the rest of the silica gel.

5. By means of indelible paint a fractional number must be written on the box top; the numerator of the fractional number is a unit mark (see Table N 1) and the denominator is a unit or set number and the number of an object "KC", from which the radar orthe unit has been taken out.

6. The packing should be carried out in the following way: the framework with its units is to be installed in a box on studs, provided with washers, as it's shown on the sealed package drawing. Washers of the same type should be put on the framework shock-absorbers. In order to clutch the shock-absorber edges botween the washers, nuts and lock-nuts are used.

Nuts, necessary to fasten the framework in the package, can be tightened by using a socket wrench.

The units K1-4aM, K1-4 M, K1-5MP, K1-6M, K1-7M, K1-8M, K1-9M, K1-10M, packed in separate packages, are to be

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inserted in their pockets and fastened by means of their setscrews.

The units K1-1M, K1-11, K1-12MP, K1-13M and cable set must be packed up in sealed boxes, provided with corrugated board linings.

The packing should be tight without tossing. Immediately before installing the units K1-5MP, K1-6M, K1-8M, K1-9M, K1-10M in the packages, gauze napkins will be inserted in the moisture absorbing tubes; each gauze napkin must contain 100g. of silica gel; the relative humidity of the silica gel must not be more than 2 percent. The absorbing tubes should be closed by using the spacing rings. In using another package, the silica gel must be inserted in the moisture absorbing tubes immediately before packing.

Then a blue silica gel is to be poured into indicating tubes and the tubes must be screwed in their jacks.

N o t e : All the operations, including silica gel insertion and package sealing, must be carried out taking no more than 4 hours with a view to minimizing the moisture absorption from the ambient air.

7. The box is to be covered with a lid. A calico tape must be glued over the split line so as to cover the split

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line and not to reach soldering points of the metal band. The glue "88" must be used. Then the metal bands and rings must be located and soldered as it is shown in the drawing. The rings must be clasped to the bands and fastened by bending the "tongues".

Note: 1) The band end rings serve for tearing off the bands only, when the packages are to be unpacked. Package handling with the use of the rings is prohibited.

2) Soldering must be carried out only by the use of a soldering iron. The use of a blowlamp is not allowed.

3) In soldering it's permitted to put boxes with the equipment in any position, however it must be done carefully.

8. The box sealing is to be checked by connecting a hose to the nipple and pumping dry air into the box until pressure will be within 0,3 ÷ 0,5 atm. (Boxes for the framework must be checked under an air pressure within 0,2 ÷ 0,3 atm. (gauge).

If a pressure drop takes place, it's necessary to reveal leakage point by means of the soapy water, let the air out of the box and solder the revealed hole.

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If no pressure drop takes place, the box must be immersed into the water during 10 min. with the object of checking it definitively.

The box is considered sealed, if bubbles don't appear. When bubbling takes place, the box should be taken out and wiped dry. The air must be let out and the leakage point must be soldered. Then the leakage test is to be repeated.

Note: 1) If the leakage is revealed in points, other than the soldering points, the box must be considered defective; in this case the equipment must be packed once again by using another box.

2) Drying of the air can be realized by passing it through a silica gel layer, thickness of which is to be no less than 50 mm.

Water content of the silica gel can be controlled by weighing it periodically. When the weight of a silica gel batch will be more by 15 percent than one of the anhydrous silica gel, it should be replaced.

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9. The box which has stood the test must be withdrawn from water, wiped dry and disconnected from the hose. Absorber water content is to be determined by the indicator colour. If the colour of the indicator became pink or pinkish-violet, the equipment must be repacked; it's necessary in this case to speed up the packing process and reduce humidity of the ambient air and of the air, used for the testing. If the indicator colour remains inveriable, a wire piece of an appropriate diameter must be inserted into the nipple and soldered around. A protecting cup must be screwed on the nipple.

10. The box is to be located in the packing case in accordance with drawings. Shavings can be used to fill gaps between the box and the case walls. A sealed box, containing the framework is to be installed on shock-absorbers and need not shaving filling.

11. The packing list should be fastened on the inner surface of the case top; then the case is to be covered and sealed up, using a seal of the Organization, which carries out packing.

12. A number, identical to the number of the sealed box, must be written on the case using an indelible ink.

13. The laying up of sealed Radars must be registered in their certificates.

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2 Packing without sealing

14. The equipment packing without sealing must be carried out with the use of the cases, indicated in the Table N 1.

Note: The polychlorvinylic covers B 6.832.006 are to be delivered together with the Radars, forming part of SPS 1:50. Immediately before sealing a cover two little bags with the tempered silica gel (100g) are to be tied to the Radar.

15. The packing must be carried out in accordance with the package drawings.

3. Equipment unpacking

16. Safety of seals and absence of case damages must be checked.

17. The packing case is to be opened. Pull out the unit (or sealed box) and its packing list. The number of any case or unit (or sealed box) must be collated with the numbers, registered in the packing list.

18. The soldered band should be torn off by using the ring. Open the box and take away the unit. The unit number must be collated with the number, registered in the packing list.

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19. Then a superficial examination must be carried out. Draw up an unpacking report.

Note: The unpacking of the equipment is allowed only in the premises at the temperatures within +5° ÷ 40°C and at the relative humidity up to 80 percent.

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CHAPTER VII

REGULATION WORKS

1. The regulation work include periodical checking of the Radar K-1M condition during its operation or storage in the storehouse and the military unit.

2. All the regulation works must be carried out in rooms at the ambient temperature within $+5^{\circ}$ - $+40^{\circ}$C and at the relative humidity no more than 80 percent.

3. The Radar K-1M, installed in a object "KC", that is not laid up, must be checked beweekly.

4. The Radar K-1M, installed in a laid up object "KC", is to be checked together with all the object "KC". The checking must be carried out usig 15 percent of all the available Radars, but no less than 3 Radars, forming part of a lot that is stored.

Note: "Lot" is a group of Radars, laid up in the course of a mouth.

5. The Radar K-1M, partly taken away from the object "KC" and stored in the sealed package must be checked simultaneously with its object "KC". The checking must be carried out using 10 percent of all the Radars, but no less than

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two Radars, forming part of a lot that is stored.

6. The complete Radars K-1M and separate units, which had not been installed in the object "KC" and that are stored in sealed packages, should be checked on bench before installing in the object "KC" once a three months' period.

7. The regulation works include:

a) superficial examination of the equipment;

b) checking of the mounting;

c) checking of the electrical parameters;

8. Before checking in accordance with the item 9 it's neccesary to:

in case of storage of the Radar K-1M in the object "KC".

a) disconnect bullet connectors and the cable N 28;

b) disconnect the fluxible waveguide sections;

c) loosen the framework shock-absorber fastening and take away the Radar from the "KC" compartment;

in case of stororge in package:

a) unpack the Radars

b) remove taps from the plug connectors and waveguides.

9. Superficial examination

a) check if there are leads on their places;

b) check the painted points of the potentiometers, attenuators and crystal holders;

c) examine the framework shock-absorbers;

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d) examine the framework and make sure that there are no dirt on it, mechanical damage or coating damage;

e) check reliability of the unit fastener in the framework;

f) examine front panels of the units, which are located in the framework and check if they are clean and their coating is safe. Check the connecting cables, plug connectors and cramps, monitoring jacks, make sure that there are no corrosion or mechanical damage;

g) disconnect two U.H.F. cables of one of the units and make sure that there are no cracks or splits in the filler and no corrosion in the UHF plug connectors;

Note: If there are defects, all the U.H.F. plug connectors must be checked.

h) check the condition of the toggle switches "Manual A.F.C." (unit K1-5MP) and "Strobe - +" (unit K1-6M) by changing over several times;

i) take away the protective shield of the units K1-4aM and K1-4 M, examine the unit K1-4aM, make sure that there is no dirt on the components or internal or external parts of the waveguide section;

check fastening reliability of the unit, cable N 29, attenuators and crystal holder nut;

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j) carry out such examination of the unit K1-46M and examine the unit K1-8M preamplifier (absence of corrosion);

k) check reliability of the K1-4aM and K1-4M interconnection;

l) take away the polystyrene radome and examine the unit K1-7M (absense of mechanical damage, dirt and corrosion);

m) check the unit K1-11 (absence of mechanical damage and corrosion);

n) examine the unit ОЛК-1А, check fastening reliability of the unit, condition of the shock-absorbers, make sure that there are no dents on the housing or on the plug connectors or corrosion on the components;

o) examine the unit K1-12M2, make sure that leads are on their places, the unit is well fastened to the framework, the dents are absent on the housing; check the U.H.F. plug connectors of the cables N 28 and N 31;

p) examine the unit K1-13M, make sure that leads are on their places, the cover is well fastened, dents, cracks, dirt or corrosion are absent on the unit housing and the plug connectors; check fastining reliability of the fuses;

q) examine the motor-alternators MA-500M and MA-250M.

10. Take away the units from the framework; open the units and make sure that dirt, corrosion, foreign bodies

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or wire breaks in soldering points are absent; check the resistors and fastening reliability of the components.

11. If during the examination, which is to be carried out in accordance with the items 9 and 10 of this Chapter, some defect will be revealed, it's necessary to eliminate it.

12. Checking of the electrical parameters must be carried out in accordance with the program and procedure, described in the Chapter II of the Instruction.

13. If in the course of checking of the predetermined number of Radars it will be clear, that the equipment has some defects, an additional number of Radars must be checked; in this case the additional number of Radars which must be checked, is to be equal to the number, of the Radars, checked firstly.

If the same or another defects will be revealed in the Radars, checked additionally, all the Radars, forming a lot, must be checked.

14. If no defects will be revealed in the course of checking of an additional number, all the Radars, forming part of the lot, (with the exception of faulty ones) may be stored during the next period.

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15. The Radars K-1M, which have been considered defective by the object "KO" manufacturer, should be replaced by the object "KO" manufacturer, using Radars, that are available in storehouses.

The units K1-3M, K1-7M, K1-1M, K1-13M, K1-11 are not to be replaced (if they are all right).

The Radars, which are installed in the objects "KO" and put out of action in storehouses or military units, must be replaced by the storehouse or military unit personnel, using Radars, stored in storehouse or Radars, sent by the manufacturer.

The units K1-1M, K1-3M, K1-7M, K1-11, K1-13 are not to be replaced (if they are all right).

16. Defect elimination and faulty Radar storage is to be decided by the military unit or by the organization, which stores Radars K-1M.

If this decision have been taken, all the works must be carried out in accordance with items 15, 17, 18, 19 of the chapter and with due regard for Appendix 10.

17. Elimination of the faults, associated with unit taking away from the framework, must be carried out by skilled technical personnel with permission of the commanding officer or administration of the organization.

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which stores Radars K-1M and should be stated in a report, that is to be approved by the commanding officer or administration.

18. After eliminating defects, the units must be installed in their places and sealed once again; all the interconnections must be carried out also.

19. All the realized works must be registered in the Radar K-1M Certificate (sheet "Operation not...

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CHAPTER VIII

TRANSPORTATION OF THE EQUIPMENT K-1M

1. The Radar K-1M equipment is allowed to be transported if it is packed in the hermetically sealed packages or in the packages without sealing:

a) by truck within 3.0 km range at a speed of 30km/hour max., when metal or paved roads will be used;

b) by truck within 1000 km range at a speed of 50 km/hour.max., when asphalt or concrete pavement highways will be used;

c) by rail within 10 000 km range;

d) by air or by sea within any range.

2. In transporting, handling, loading and unloading the packing cases, their position must be in accordance with inscriptions.

3. The cases must be handled with care: turning over and throwing down are not allowed.

4. In transporting the equipment the cases, having similar dimensions, may be positioned one over another in four tiers.

5. All cases must be well fastened to prevent them from shocks in using any transport.

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6. If the equipment is to be transported by truck, the trucks must be loaded so that load weight will be equal to 2/3 of the truck carrying capacity. If ballast is to be used, it should be fastened carefully also.

7. Transportation of the equipment by the use of open-top trucks and flatcars is allowed on condition that packing cases will be covered with a waterproof tarpaulin or another material like it. Under such conditions storage of the equipment is allowed during three days, if the equipment is packed in the sealed package, and during 5 days, if it is hermetically packed.

8. Transportation of the equipment together with acids, alkalies etc, which destroy metals and coating, is forbidden.

9. Transportation of the objects "KC" in which the equipment is installed, must be carried out in accordance with the Instruction of transportation of the object "KC".

10. Towage of the object "KC", in which the equipment K-1M is installed, must be carried out at a speed up to 15 km/hour by means of a bogie and a truck.

11. After transporting the equipment at negative temperatures, it should be kept during 12 hours in a heated room of storehouse till its temperature will be above zero

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Appendix N 1

RADAR K-1M PARAMETER TEST BOOK

Radar K-1M (? ..... manufacturing date ..... 196...

Object "RC" ..... manufacturing date ..... 196...

Beginning 196...

End. 196...

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Note

1. The Book is to be filled in using ink only.
2. The sheet F 1 should be filled in the military unit where the Radar K-1M and the object "KC" are operated.
3. The sheets NN 3-7 are to be filled in when the Radar parameters are checked.
4. If some parameter has been adjusted during the Radar parameter checking, this fact must be written down in the sheet "Remarks". Remark must be countersigned by the person, who has carried out the adjusting.
5. All the amendments must be mentioned and counter

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№	Parameters to be checked	Unit of measure	Rated parameter value and tolerance by the Operating Instruction	Measurement data										
1	2	3	3	5	6	7	8	9	10	11	12	13		
1.	Checking date				meas. data	meas. data	meas. data	meas. data	meas. data	meas. data	meas. data	meas. data	meas. data	meas. data
2.	Missile-borne network voltage	v	27 ± 1,5											
3.	MA-500M voltage	v	115 ± 5											
4.	MA-250M voltage	v	115 ± 5											
5.	Rectified voltages:													
	+ 300 v reg.	v	300 ± 10											
	+ 300 v unreg.	v	300 + 30 - 20											
	- 147 v reg.	v	147 ± 6											
	- 300 v reg.	v	300 ± 10											

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6	Crystal current A/B	ma	0.5 ± 0.3		
7	Synchronization blocking generator natural oscillation period	sec.	longer by 75±150 μsec than the period at the frequency "H"		
8	Reference voltages: a/in regime "A" 0°/90°	v	2.8 + 1.2	a/ 7/k"	
	b/ in regime "B" 0°/90°	v	2.8 + 1.2	b/of the Radar K-IIM	
9	Tuning of the Radar K-IM at the frequency:	mcps			
10	Delay time of the radio control switch on (command K 1)	sec.	39 ± 2		
11	Channel A.F.C. sensitivity: a/ at the frequency "k" (transmitter of the K-IIM)	dbm	50 ÷ 76		
	b/ at the transmitter K-IIM frequency + 18 Mc	dbm	50 ÷ 76		

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1	2	3	4	5	6	7	8	9	10
	c/ at the transmitter K-IIM frequency - 18 Mc	dbm	50 ± 76						
12	Synchronisation channel sensitivity.	dbm	no less than 48						
13	Driving voltage unbalance	v	± 0.25						
14	Error channel "A" sensitivity	dbm	no less then 45						
15	"A" driving voltage transconductance	v/mod	0.1 ± 0.02						
16	Phasing error "A"	grade	no more than 6						
17	Angle between the axes of coordinates	grade	90 ± 6						
18	Initial pulse delay of the responder	sec							
	in "A" regime	"	170 ± 20						
	in "B" regime	"	no more than 10						
19	Responder transmitter frequency	Mc	± 8						
20	Average radiation power of the responder transmitter	mW	no less than 180						
21	Autoselector K1-9N search period	sec	3 ± 1						

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1	2	3	4
22	Regime "B" interlocking time	sec.	200 ± 8
23	"Memory" time of the command N 2 (commutating to "B" regime)	sec.	3 ± 1.0
24	Lock sensitivity of the relay, commutating to "B" regime (command N 2)	dbm	75 ÷ 81
25	Unlock sensitivity of the relay, commutating to "B" regime (command N 2)	dbm	no more than 6 over the lock sensitivity level
26	Echo-signal locking range	sec	within the limits of 120±20 up to 174
27	Echo-signal tracking range	sec	within the limits of 120±20 up to 1.6±1
28	"B" driving voltage transconductance	v/grade	5 ± 0.75
29	Channel "B" attenuation of the [illegible] channel of the [illegible] and the regular K-174 (valu)	db	is to be determined in measuring

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	1	2	3	4	5	6	7	8	9	10	11	12	13
30		"B" phasing error Direction of the K-1044 antenna deviation (in accordance with "KC" flight direction). Board K-109 instrument reading: 5 cm upwards " " 5 cm down " " 5 cm to the left " " 5 cm to the right " "	Y	no more than 1									
31		Time during which the Radar has been operated											
32		Number and manufacturing date of the set K-1004, used for parameter measuring											
33		Post and signature of the person, who has carried out the parameter measuring.											

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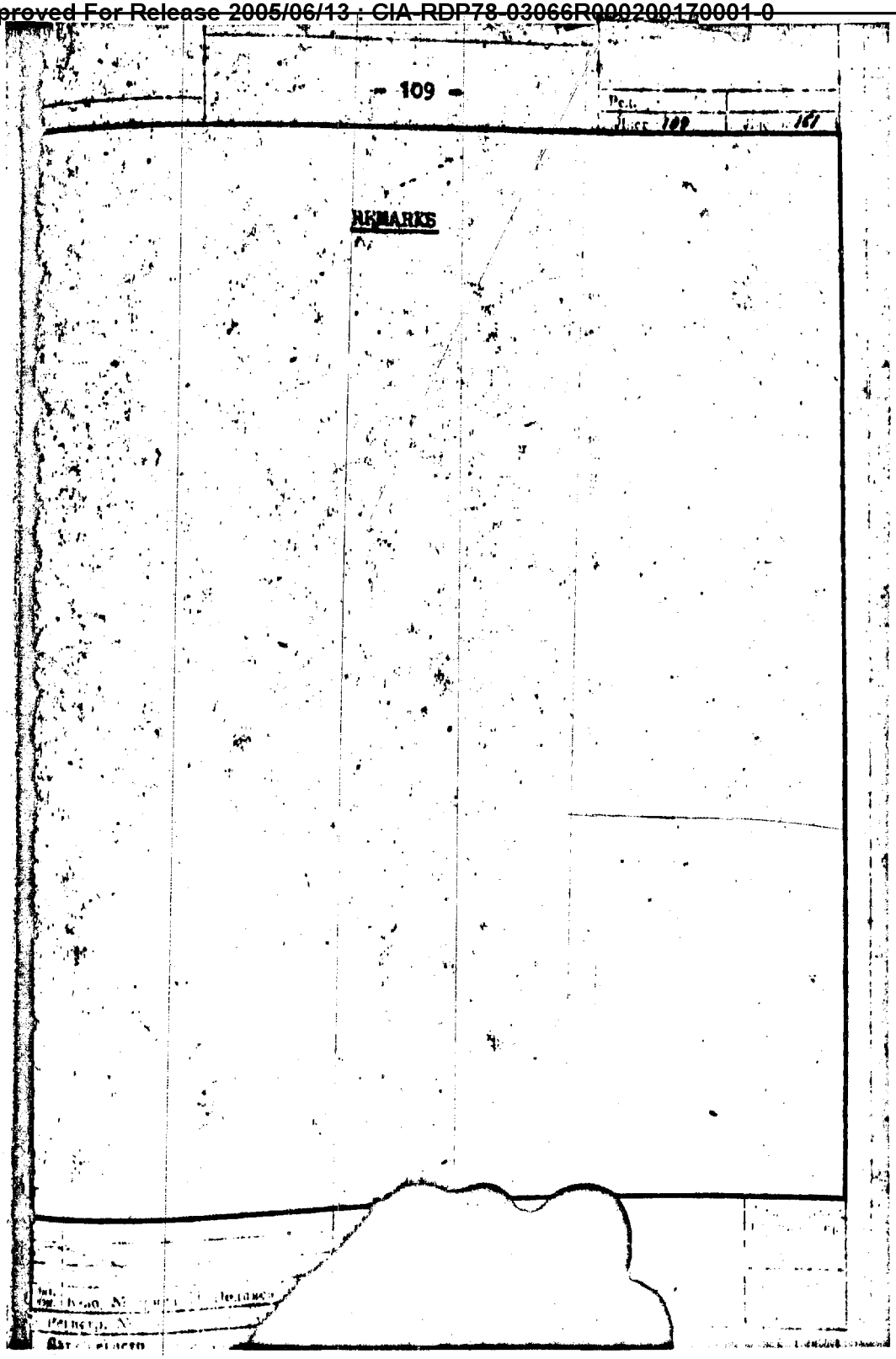

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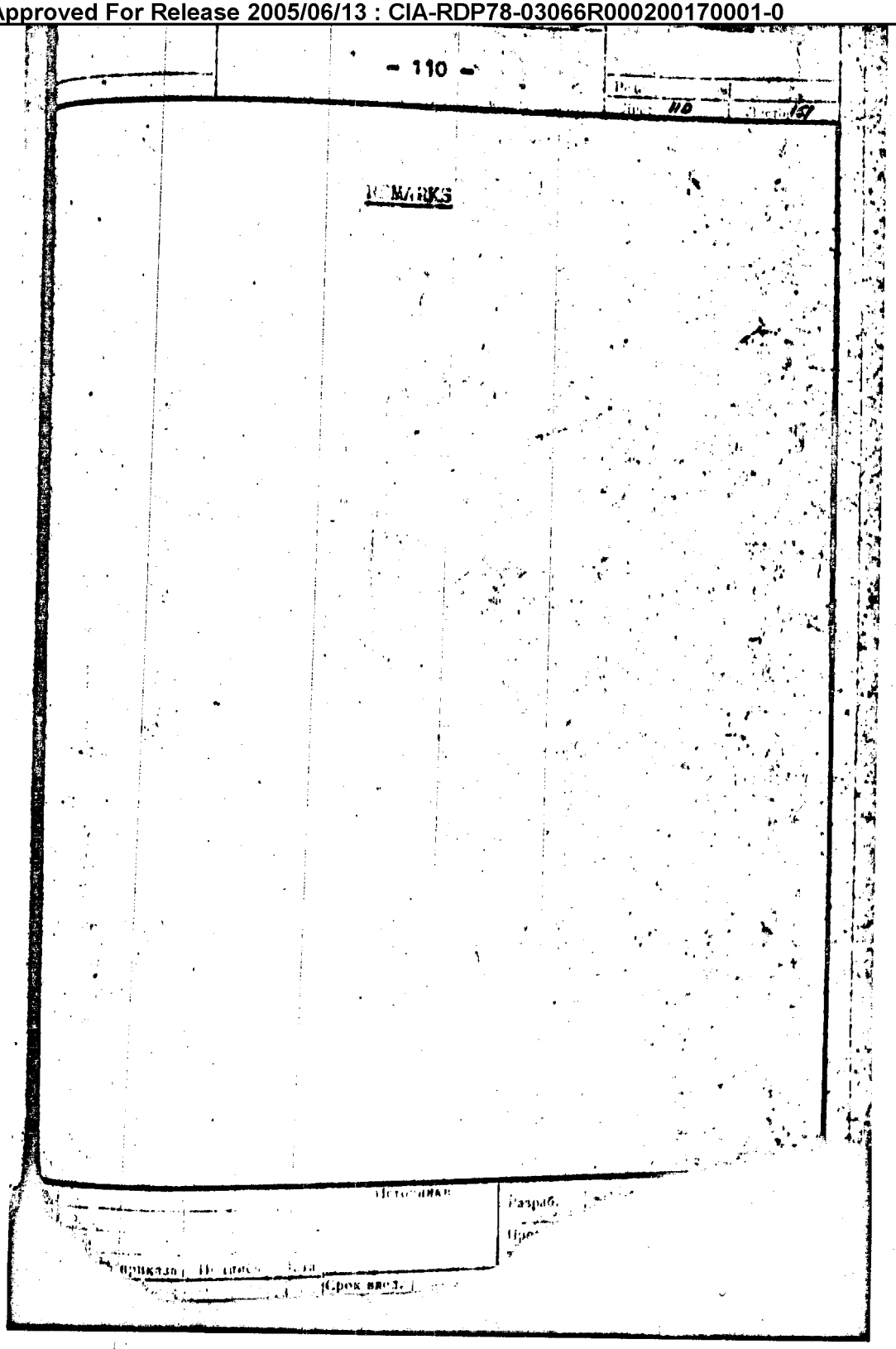

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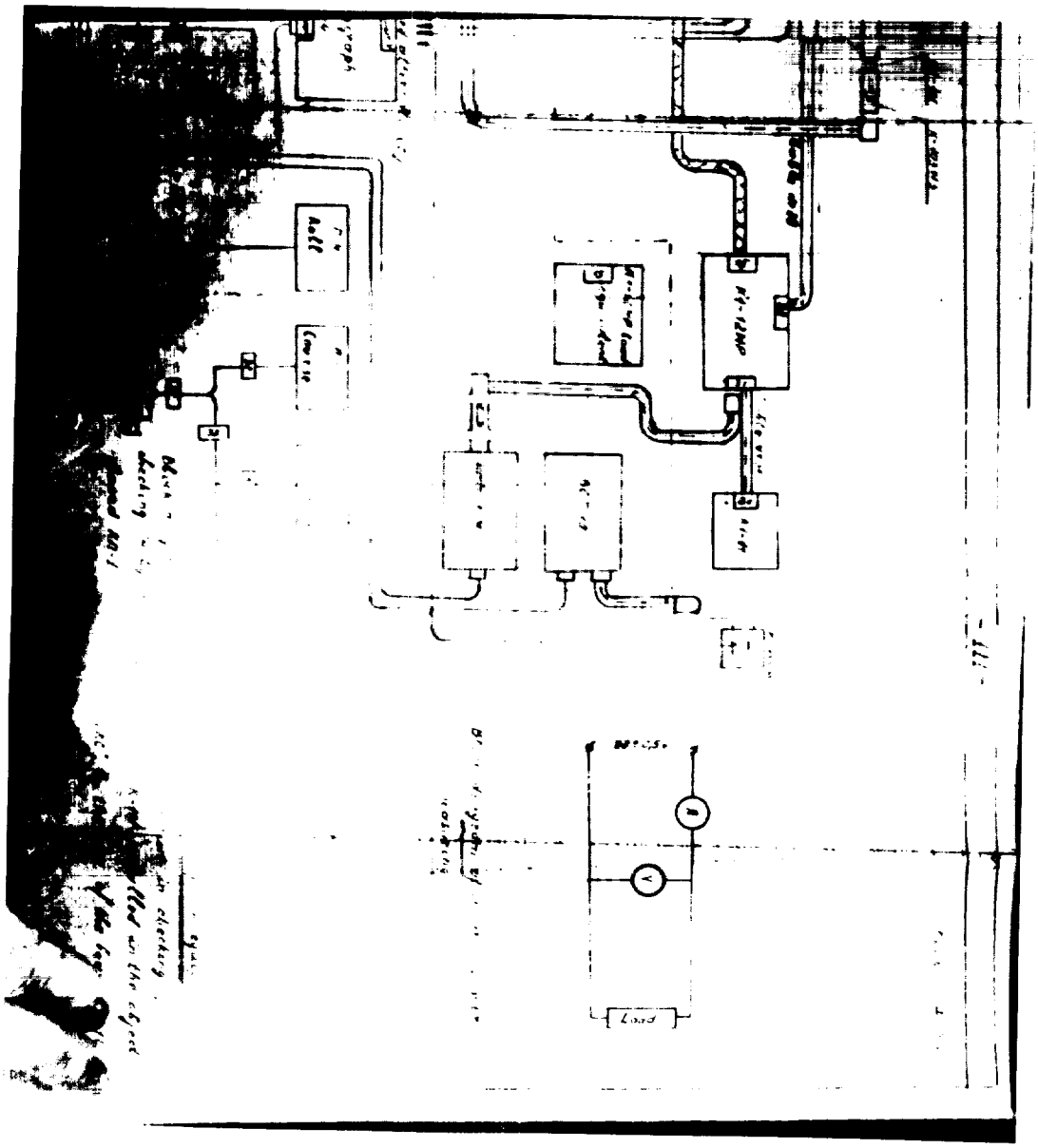

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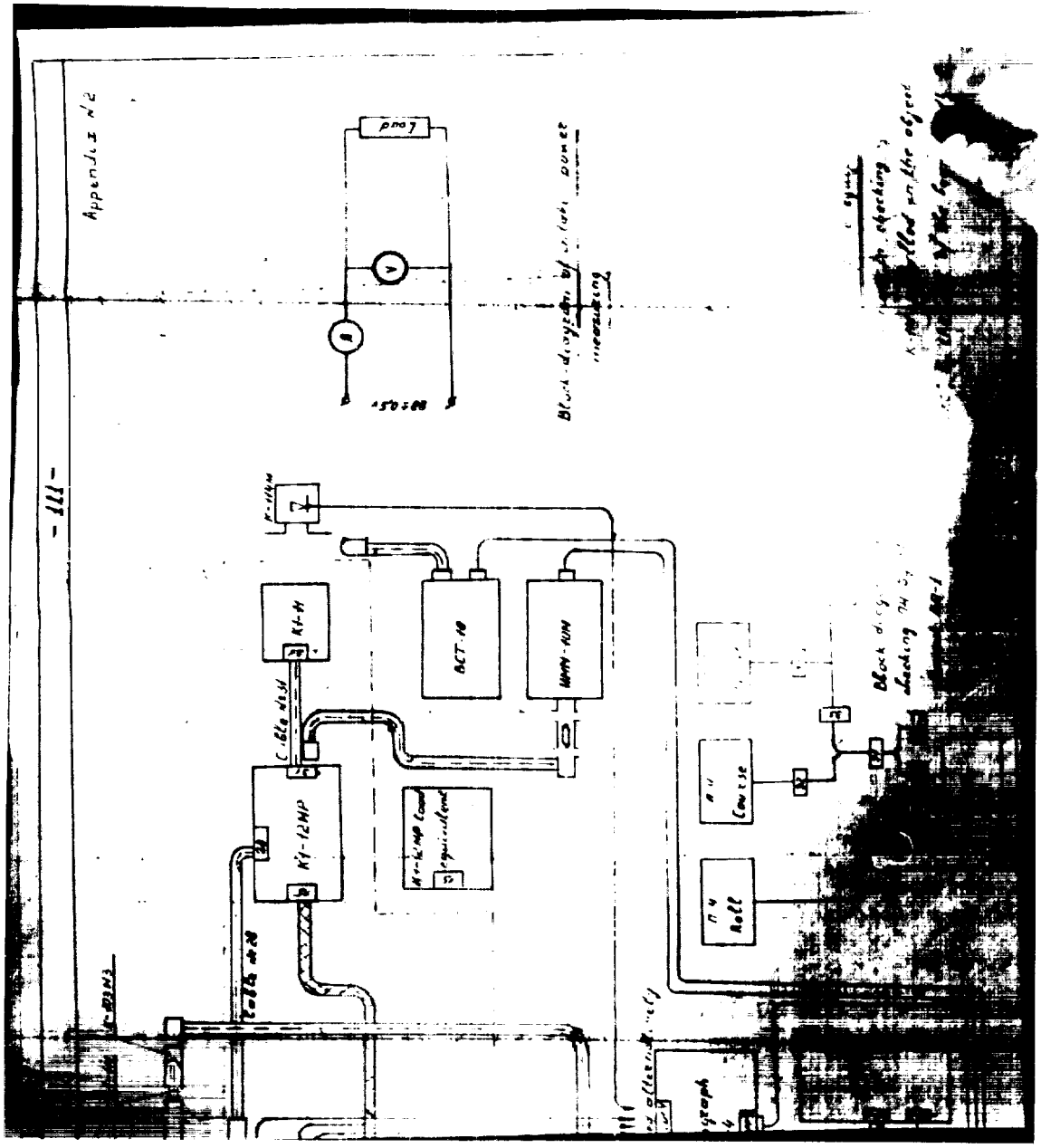

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Attachment No. 7 to

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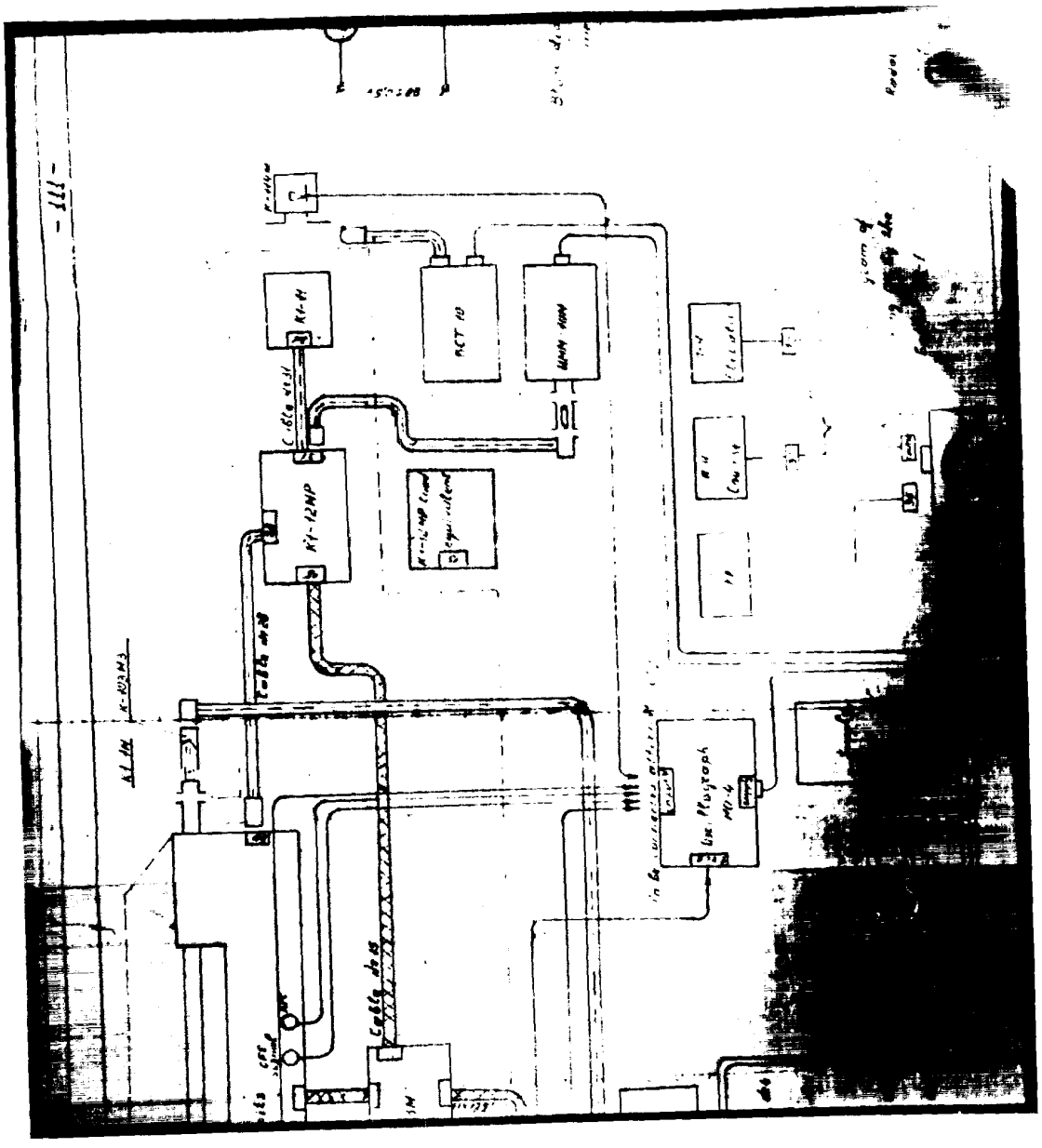

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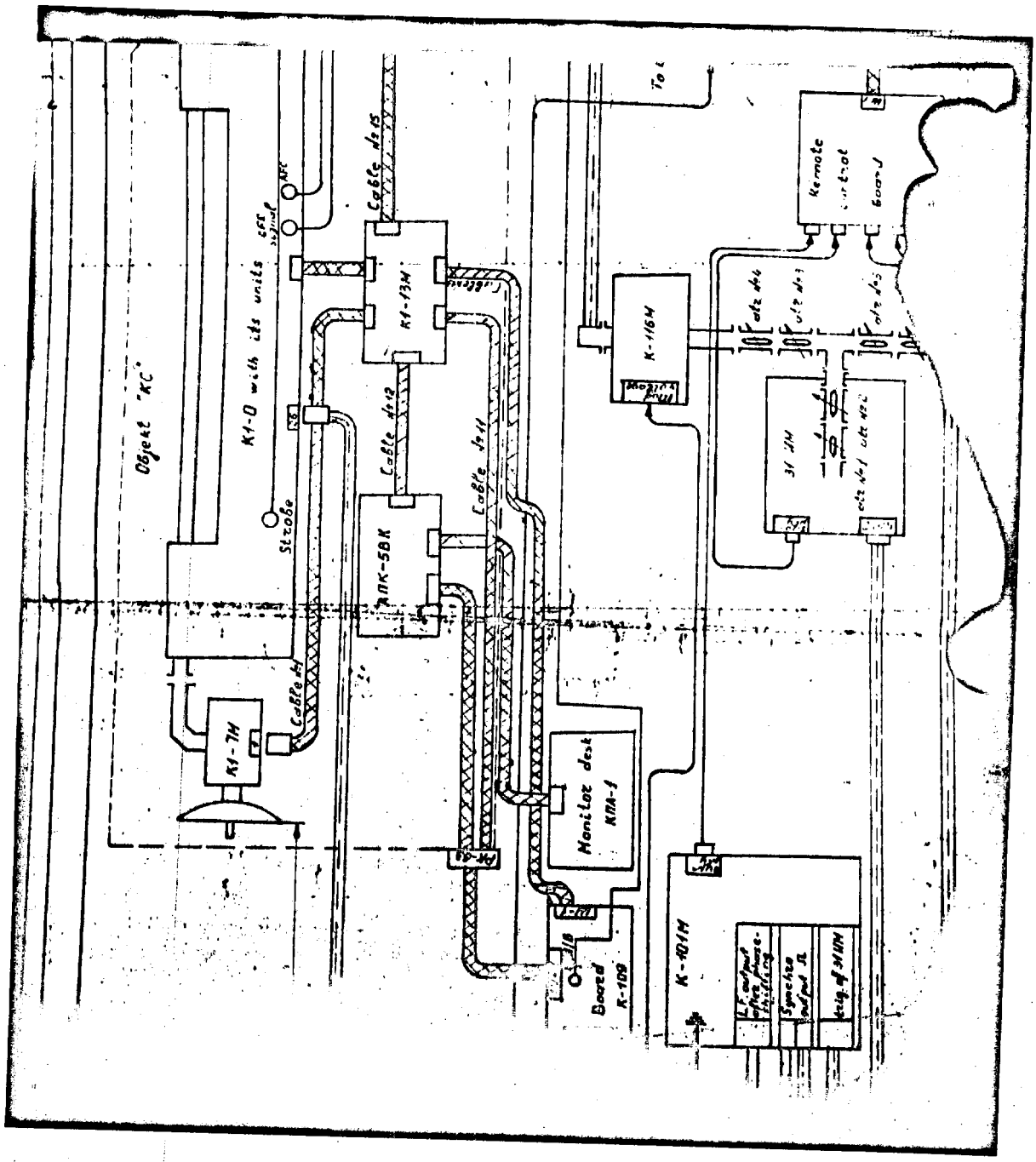

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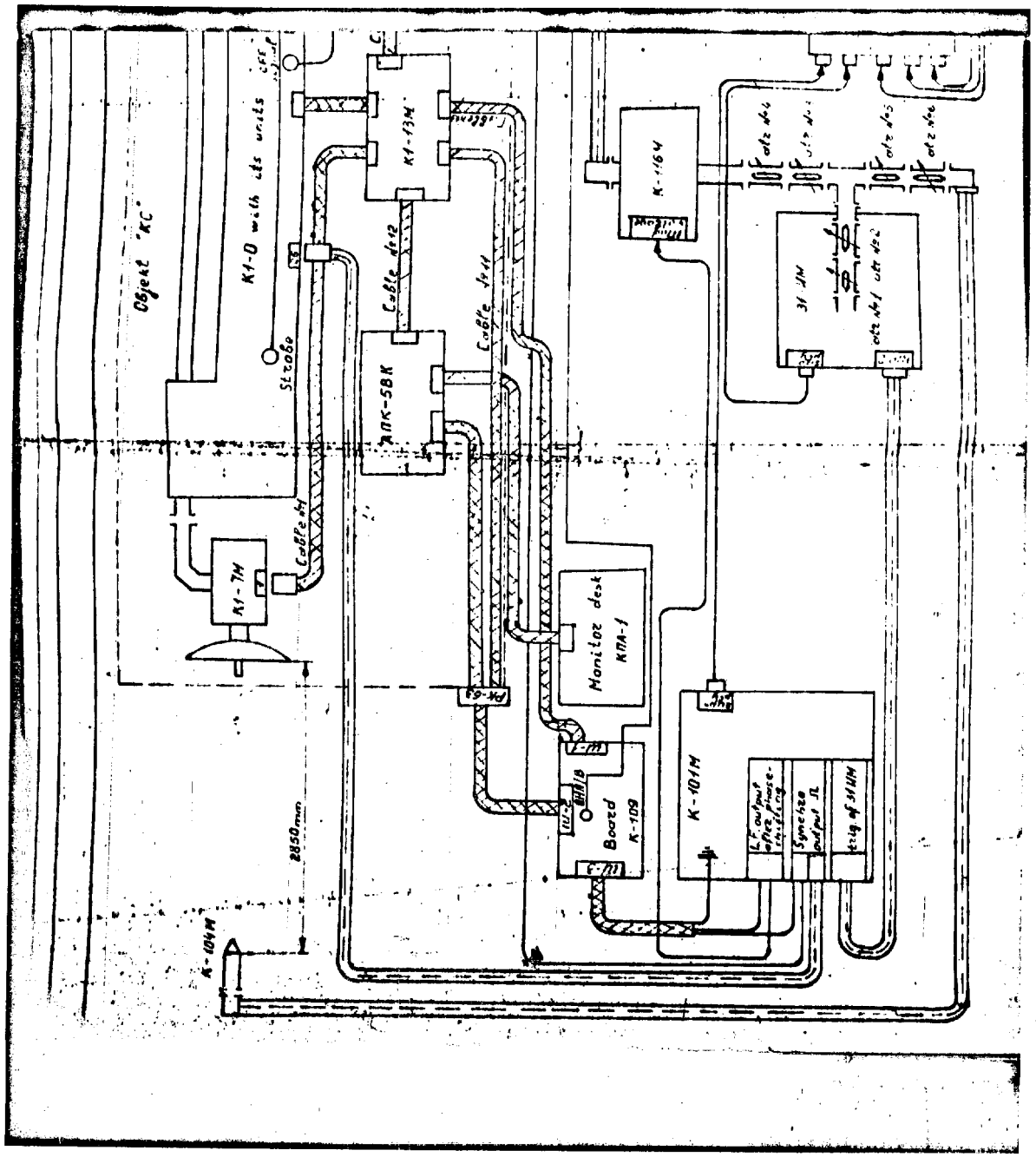

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Appendix N 2

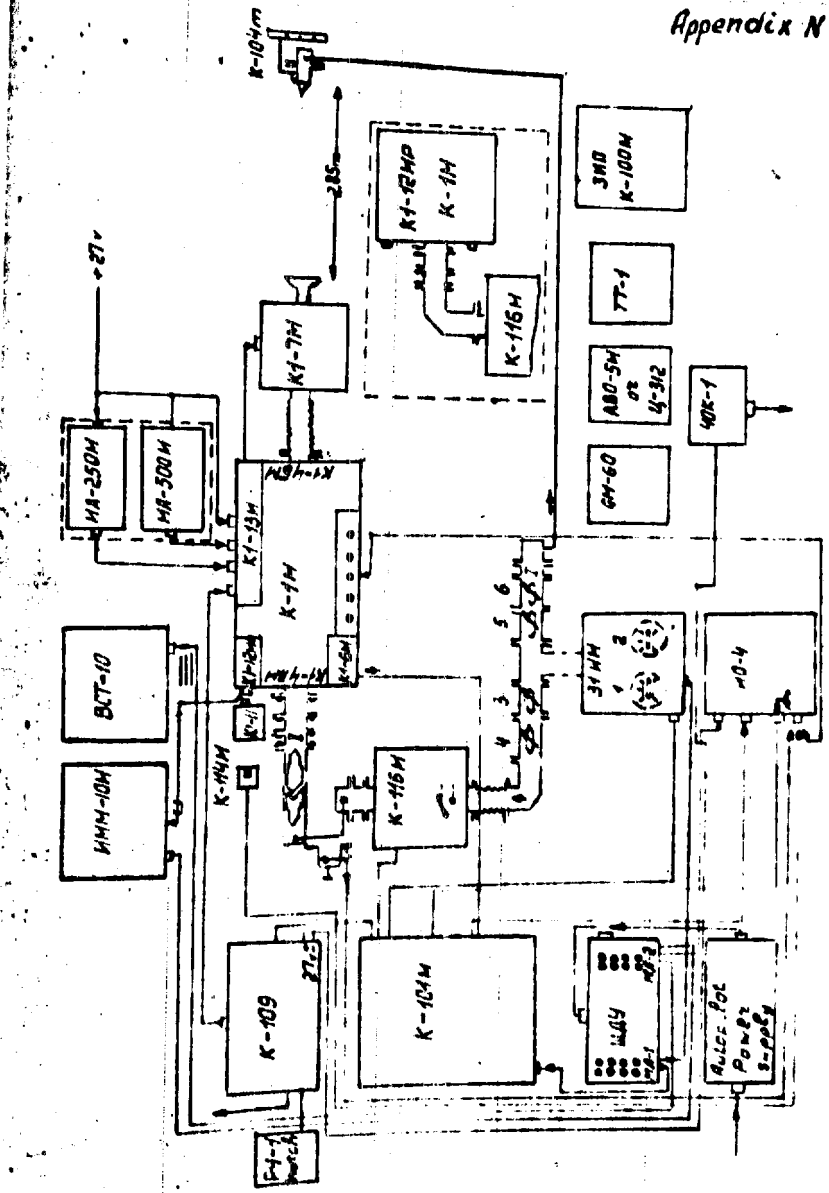

Fig. 6. Block-diagram of the equipment interconnection in bench-checking the under-radio parameters.

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Appendix N 4

INSTRUCTION

OF AGING OF THE METAL-CERAMIC TRIODE -17

(unit K1-12MP of the Radar K-1M)

Before switching on the unit K1-12 MP all the metal-ceramic triodes of this unit must be aged following the procedure:

1. Take away the cap of the object "KC" forward section and disconnect the cable N 28 from the unit K1-6M.

2. Interconnect the board 40K-1 of the check equipment K-100M and the plug connector " K-17M + PK-63" of the object "KC" by the use of the cable "K1-13M + K-109".

Note : In checking the Radar K-1M on bench the board 40K-1 is to be connected to the plug connector "ДК-17М÷РК63" of the unit K1-13M by means of the cable "K1-13M + K-109".

3. Connect the instrument Ц -312 or АВО-5М to the board 40K-1 terminals " вольтметр "; set the toggle switch " жесткение " in the position " [illegible] " and turn the knob " напряжение подогр." counter clock-wise as far as it will go.

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Set the toggle switch "ТЕМ ОБЩИЙ " of the board 40К-1 in the position ГИ-136.

4. The board 40К-1 plug should be inserted in the terminals " Корпус 27 v" of the board К-100.

Warning: In inserting the plug it's necessary to give particular attention to the polarity!

5. Set the toggle switch "Напряжение " of the board 40К-1 in the position "ВКЛ." and fix voltage on the level of 13.2 v by means of the knob "регулировка напряжения" in accordance with the instrument Ц-312 readings (scale 15 v) or the АВО-5М readings.

6. Keep the equipment in this regime during 10 ÷ 15 min.

7. Then switch on the Radar in accordance with the Maintenance and Operational Instruction of the Radar К-1М.

8. 5 minutes later set the toggle switch " Накал" in the position "ВКЛ." and connect the cable N 28 to the unit К1-6М.

9. Keep the equipment in this during 10 ÷ 15 min.

The aging of the tubes ГИ-136 is to be carried out during the Radar К-1М parameter checking before checking the general capability of the Radar.

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Appendix N 5

INSTRUCTION

of the Radar K-1M tube replacement

Tube position	Tube type (symbol)	Spare Parts set (SPS)	Subject of checking: Operational Instruction: procedure item	Parameter	Potentiometer	Remarks
1	2	3	4	5	6	7
			UNIT K1-4aM			
1 D1	DK-C4	SPS-1	it.12b § 6	Crystal current		Set the max. current by adjusting the crystal holder position.
2 Klystron	K-38	SPS-2	it.1 §7	Radar K-1M tuning at the Radar K-1M transmitter frequency	Mechanical tuning knob of the Klystron	
			UNIT K1-4bM			
3 D1	DK-C4	SPS-1	it.12b § 6	Crystal current		Set the max. current by adjusting the crystal holder position.
			UNIT K1-5MP			
4 1	6Zh1P	SPS-2	it.7 § 7	"A" channel sensitivity		

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2	3	4	5	6	7	8
2	6Ж1П	SPS-2	it.7 § 7	"A" channel sensitivity		
3	6Ж1П	SPS-2	it.7 § 7	-"-		
4	6Ж1П	SPS-2	it.7 § 7	-"-		
5	6Ж1П	SPS-2	it.7 § 7	-"-		
6	6Ж1П	SPS-1	it.3 § 7	A.F.C.channel sensitivity		
7	6Н1П	SPS-1	it.3 § 7	-"-		
8	6Н2П	SPS-2	it.3 § 7	-"-		
9	6Н1П	SPS-2	it.3 § 7	-"-		
10	6Ж2П	SPS-2	it.3 § 7	-"-		
11	6Н1П	SPS-2	App.7 it 4 of the procedure	A.G.C.characteristics in "A" regime	R86	
12	6Н1П	SPS-1	-"-	-"-	-"-	
13	6Н1П	SPS-2	-"-	-"-	-"-	
17	6Н1П	SPS-2	it.5 § 7	Synchronization channel sensitivity		
18	6Н1П	SPS-2	it 5 §7	-"-		
19	6Н1П	SPS-1	-"-	-"-		
			UNIT K1-6Ж			
1	6Н1П	SPS-2	it.9 § 7	"A" Phasing and angles between the axes of coordinates	"Phase"	
			it.10 § 7	Initial pulse delay		

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1	2	3	4	5	6	7	8
21	2	6H2П	SPS-2	it.4 § 9 it.9 § 7	Locking range "A" phasing and angles between the axes of coordinates	"Phase"	
22	3	6H1П	SPS-2	it.9 § 7	-"-		
23	4	6H2П	SPS-2	it.9 § 7	-"-		
24	5	6H1П	SPS-2	it.9 § 7	-"-		
25	6	6H2П	SPS-1	it.9 § 7	-"-		
26	7	6H2П	SPS-2	it.9 § 7	-"-	" hase"	
27	8	6K3	SPS-2	Appendix 7 item 3 of the procedure	A.C.C.characteristics in "B" regime	Output amplitude	
28	9	6K3	SPS-2	Appendix 7 item 4 of the procedure	A.C.C.characteristics in "A" regime	R86	
29	10	6H1П	SPS-2	it.9 § 7	"A" phasing	"Phase"	
				it.8 § 7	"A" driving voltage transconductance	Amplification "10"	
				it.5 § 9	"B" Phasing. "B" driving voltage transconductance	Amplification "A"	
30	11	6H1П	SPS-2	it.9 § 7 it.8 § 7 it.5 § 9	-"-	-"-	
31	12	6H2П	SPS-2	it.9 § 7 it.8 § 7 it.5 § 9	-"-	-"-	

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1	2	3	4	5	6	7	8
12	13	6H2П	SPS-2	it.9 § 7	"A" phasing and angles between the axes of co-ordinates	"Phase"	
13	14	6H1П	SPS-2	-"-	-"-	-"-	
14	15	6H2П	SPS-1	-"-	-"-	-"-	
15	16	6H2П	SPS-2	-"-	-"-	-"-	
16	17	6H1П	SPS-2	-"-	-"-	-"-	
17	18	6H1П	SPS-2	-"-	-"-	-"-	
18	19	6H1П	SPS-2	-"-	-"-	-"-	
19	20	6H1П	SPS-2	-"-	-"-	-"-	
				UNIT K1-8M			
40	1	6Ж1П	SPS-2	it.3 § 9	Command N 2 operating sensitivity	"M.V.C."	
41	2	6Ж1П	SPS-2	-"-	-"-	-"-	
42	3	6Ж1П	SPS-2	-"-	-"-	-"-	
43	4	6Ж1П	SPS-2	-"-	-"-	-"-	
44	5	6Ж1П	SPS-2	-"-	-"-	-"-	
45	6	6Ж1П	SPS-2	-"-	-"-	-"-	
46	7	6Ж1П	SPS-2	-"-	-"-	-"-	
47	8	6Ж1П	SPS-2	-"-	-"-	-"-	
48	9	6Ж1П	SPS-2	Appendix 7 item 3 of the procedure	A.C.C. characteristics in "B" regime. Command N 2 operating sensitivy	M.V.C. output amplitude	

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2	3	4	5	6	7	8
10	6Ж1П	SPS-2	Appendix 7 item 3 of the procedure	A.G.C.characteristion in "B"regime Command N 2 operating sensitivity	M.V.C. output amplitude	
11	6Н1П	SPS-2	it.3 § 9	Command N 2 operating sensitivity	"M.V.C."	
12	6Н1П	SPS-2	-"-	-"-	-"-	
13	6Н1П	SPS-2	-"-	-"-	-"-	
			UNIT K1-9M			
1	6Ж2П	SPS-2	it.1 § 9	Search speed	R-21	
			it.4 § 9	Search range	R-13 R-12	
			it.3 § 9	Accumulator voltage	R-23	
2	6Н1П	SPS-2	it.1 § 9	Search speed	R-21	In opening the tube replace the moisture absorber
			it.4 § 9	Search range	R-12	
3	6Ж2П	SPS-2	it.1 § 9	Search speed	R-23	
			it.4 § 9	Search range	R-12	
4	6Ж2П	SPS-2	it.3 § 9	Command N 2 operating sensitivity		
5	6Ж2П	SPS-2	-"-	-"-		
6	6Н1П	SPS-2	it.4 § 9	Locking range	Search start.	
9	6Н1П	SPS-2	-"-	-"-		

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1	2	3	4	5	6	7	8
60	10	6H1П	SPS-2	it.4 § 9	Locking range	"Range" "search start"	Set the upper limit of the potentiometer "range", then the lower limit of the potentiometer "search start".
61	11	6H1П	SPS-2	it.4 § 9	Lock range	"Range" "Search start"	
62	12	6H1П	SPS-2	it.3 § 9	Command N 2 operating sensitivity	"M.V.C."	
63	13	6H1П	SPS-1	-	-"-		
64	14	6H1П	SPS-2	it.3 § 9	"Memory time"		
65	15	6H1П	SPS-2	it.3 § 9	Command N 2 Operating sensitivity	"M.V.C."	
				UNIT K1-10M			
66	1	5Ц4М	SPS-2	it.12a § 6	+300v.unreg.	R1	
67	2	5Ц4М	SPS-2	it.12a § 6	+130v. reg.	R13	
68	3	5Ц4М	SPS-2	it.12a § 6	-"-	-"-	
69	4	6П13С	SPS-2	-"-	-"-	-"-	
70	5	6Ж1П	SPS-2	-"-	+130v.reg.	R13	

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1	2	3	4	5	6	7	8
71	6	5Ц4М	SPS-2	it.12a § 6	+300v.reg.	R22	
72	7	6Н13С	SPS-2	-"-	-300v.reg.	R31	
73	8	6Ж1П	SPS-2	-"-	+300v.reg.	R22	
74	9	СГ3П	SPS-2	it.12a § 6	+130v.reg.	R13	
					+300v.reg.	R22	
75	10	5Ц4М	SPS-2	it.12a § 6	-147v. reg.		
					-300v. reg.	R31	
76	11	6Ж1П	SPS-2	-"-	-"-	-"-	
77	12	СГ3П	SPS-2	-"-	-147v.reg.		
					-300v.reg.	R31	
78	13	СГ3П	SPS-2	-"-	-147v.reg.		
				UNIT K1-12MP			
79	1	6Н1П	SPS-2	it.10 § 7	presence of UHF radiation and initial delay	R-14	After opening check the unit sealing
80	2	6Н1П	SPS-2	-"-		-"-	
81	3	6Н1П	SPS-1	-"-		-"-	
82	4	ГИ-30	SPS-2	-"-			
83	6	2Ц2С	SPS-2				
84	7	2Ц2С	SPS-2				
85	8	6Ц5С	SPS-2				
86	9	ГИ-13Б	SPS-2	frequency power	adjusting screw coupling screw.		

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Note: All the tubes of the units are allowed to be replaced by the technical personnel of the military unit or storehouse. After opening the unit K1-12MD it's necessary to check its sealing following the procedure:

1. Unscrew and take away the unit tap and screw in a nozzle through which air must be pumped up to 0,8 atm (gange).

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Appendix N 6

The Instruction of the replacement of the Radar K-1M units

Name and symbol of unit	Subject of checking and adjusting in replacing unit	Item of the operational instruction	Tuner
2	3	4	5
A-mixer K1-4aM	1.Tune the Radar at the frequency "4"	it.6 § 6 and it.1 § 7	The klystron frequency tuner.
	2.A-mixer current	it.12b § 6	The attenuators of the A - side and the klystron section.
	3.A.F.C.operation	it.1 appendix N 6	The unit K1-5M potentiometer "A.F.C."
	4.The decoupling between the A and B inputs	it.2 appendix N 6	
B-mixer K1-4bM and B-receiver K1-8M together	1. B - mixer current	it.12b § 6	The attenuators of the B-side and of the klystron section.
	2.Adjust the B-receiver A.G.C.	it.3 appendix N 7	R48 of the unit K1-9M
	3.The command N 2 operating sensitivity	it.3 § 9	The unit K1-8M potentiometer "S.E."
	4.The decoupling between the A and B inputs	it.2 appendix N 7	

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2	3	4	5
A-receiver K1-5MP	1.Tune the Radar at the frequency " k"	it.6 § 6 and it.1 § 7	The klystron frequency tuner
	2.The A.F.C.operation	it.1 appendix N 7	The unit K1-5MP potentiometer "A.F.C"
	3.Adjust the A-receiver A.G.C. and check its operation	it.4 appendix N 7	R86 of the unit K1-5MP (through the cover hole)
	4.The synchronization channel sensitivity	it.5 § 7	
	5.The error-signal channel sensitivity	it.7 § 7	
	6.The A.F.C.channel sensitivity	it.3 § 7	
Unit controlling the autopilot K1-6M	1.Adjust the A-receiver A.G.C. and check its operation.	it.4 appendix N 7	R86 of the unit K1-5MP (through the cover hole).
	2.Set the A-regime driving voltage transconductance	it.7 § 8	The unit K1-6M potentiometer "HO -Gain".
	3.Phasing error and angle between the axes of co-ordinates in the P-regime.	it.8 § 9	The unit K1-6M potentiometer "Phase" and the unit K1-6M potentiometer R147.
	4.Unbalancing of the driving voltages in the A-regime	it.6 § 7	The unit K1-6M potentiometers "Balance X" and "Balance Y".
	5.Pulse-position modulation	it.10g § 7	

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1	2	3	4	5
		6.Adjust the B-receiver A.G.C.	it.3 appendix N 7	R48 of the unit K1-8M
		7.Set the driving voltage transconductance in the B-regime	it.5 § 9	The unit K1-6M potentiometer "B -Gain"
		8.The B-regime phasing	it.5 § 9	The unit K1-7M reference generator stator screw.
5	Range unit K1-9M	1.Check the "accumulator zero"	it.3 § 9	The unit K1-9M potentiometer "accumulator voltage".
		2*.The autoselector locking on range	it.4 § 9	The unit K1-9M potentiometers "range of search"and "start of search".
		3+).The autotracking range	it.4 § 9	The unit K1-9M potentiometer "range of search"
		4+)The searching period	it.1 § 9	The unit K1-9M potentiometer "speed of search"
		5.The command N 2 operating sensitivity	it.3 § 9	The unit K1-8M potentiometer "M.G.C."
		6.The command N 2 releasing sensitivity	it.3 § 9	The unit K1-9M potentiometer "speed of search"(within the limits,mentioned in the it.1 § 9)
		7.The time delay of switching from the B-regime to the A-one (memory time)	it.3 § 9	

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1	2	3	4	5
6	Rectifier K1-10M	1+).The rectified voltage values	it.12a § 6	The unit K1-10M potentiometers "+130v", "+300v", "-300v" and the resistor R1.
7	Responder K1-12MP	1+).The responder output power	it.10 § 7	The coupling tuner
		2+).The responder frequency	it.10 § 7	The frequency tuner
		3+).The responder pulse delay in the	it.10 § 7	
		A-regime		R-14 of the unit K1-12MP
		B-regime		Is not adjusted
		4.The pulse position modulation percentage	it.10g § 7	

Note: The parameters, marked +), should be adjusted only in the cases, when they are not within the limits of the operational instruction.

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Appendix N 7

The Procedure of Radar K-1M parameter adjusting and checking, in replacing units and tubes

The sequence of adjusting and checking of the Radar K-1M parameters, which are not considered in the Instruction but should be checked in replacing units and tubes, is stated in the Procedure.

1. Looking on and tracking of the signal frequency by the A.F.C. system

Tune the radar-tester 31 M at the frequency " k". Set the power level equal to -43 dbm and modulation percentage equal to 60% at the mixer - "A" input.
Inject the pulses from the monitoring jack "C.F. A.F.C." to the oscillograph " O-4" input. Check the real frequency automatic tracking band by changing smoothly the 31- M frequency in both directions from the center frequency " k" till the A.F.C. stops operating. The A.F.C. band must be no less than ±18 Mc relative to the set frequency " k". The rendering symmetrical of the A.F.C. band is carried out by the unit K1-5MP potentiometer "A.F.C.".

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2. Decoupling between the "A" and "B" inputs

Connect the oscillograph O-4 input with the unit "K1-8M" jack "error-signal".

Set the unit K1-8M toggle-switch "+-strobe" into the position "+".

Set the mixer "A" input power equal to -52 dbm and the modulation percentage = 0%.

Set the mixer-"B" input power so, that the echo-pulse amplitude becomes equal to the noise, and fix the B-side attenuation.

Set the mixer-B input power at the minimum level by increasing the B-side attenuation up to the maximum.

Increase the mixer-A input power by decreasing the A-side attenuation till the echo-pulse value becomes equal to the noise again and fix this attenuation.

The difference between the A-side and B-side attenuations, which correspond to the echo-pulse amplitude equal to the noise, is a value of the decoupling between A and B inputs. It should be no less than 38 db.

3. Adjusting of the B-receiver A.G.C.

Set the B-side channel attenuation equal to 65 db and the A-side one - by 3 ÷ 6 db less than the A.F.C.stopping

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level.

Move the antenna K-104M to the right from the E.S.L. position by 33 mm. Obtain a maximum value of the course driving voltage by turning the unit K1-8M potentiometer R48. The elevation driving voltage should be set on zero division by rotating the reference generator stator.

4. Operational error of the A-channel A.G.C.

Set the unit K1-4aM input power equal to -35 dbm and the modulation percentage equal to 40%.

Obtain a maximum value of the course driving voltage by turning the unit K1-5M potentiometer R86 through the left hole of the unit cover (to avoid grounding, a spaghetti should be put on the screw-driver). The elevation driving voltage should be decreased to zero by turning the unit K-101M knob "фаза".

Set the course driving voltage value equal to 4v by using the potentiometer "IO amplification". Change the mixer-A input power from the maximum value to -43 dbm and measure the course driving voltage value at 3÷4 points. The A.G.C. operational error should be determined as a difference between the maximum and minimum values of the driving voltages divided by the maximum one and multiplied by 100%.

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The A.G.C. operating error must be more than 20%. If the A.G.C. response does not meet this requirement the pulse amplitude should be readjusted by turning the unit K1-5M potentiometer R86.

Note: The tuners, listed above, may be used only in replacing tubes and units.

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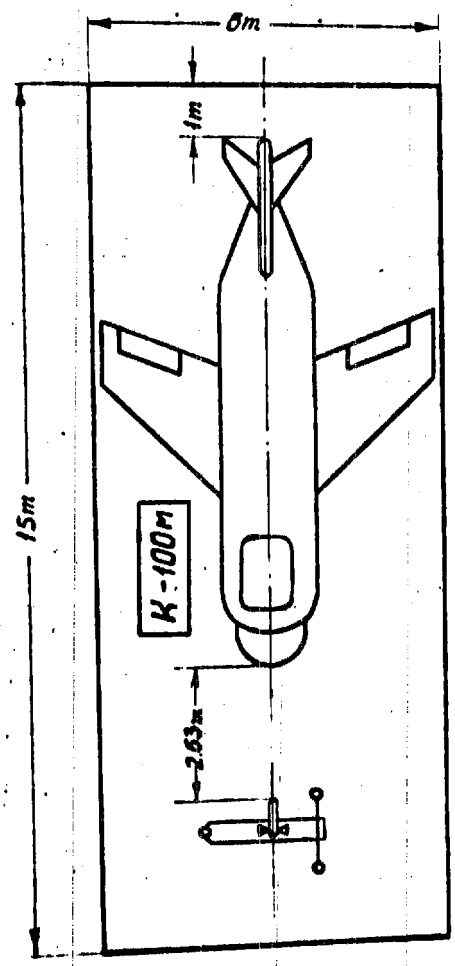
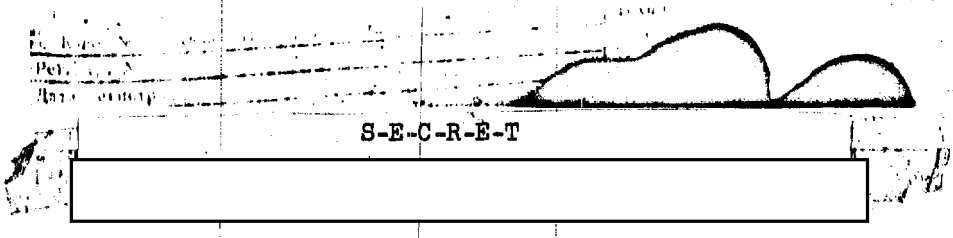


Fig.N9

Approximate displacement of the object "KC" and equipment K-100K on the area for the Radar K-1M parameter checking.



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Appendix N 9

Extract

from the Instruction of laying up,

longterm storage and withdrawing from storage

of the motor-alternators

MA-250M and MA-500M

Motor-alternators, which are to be stored during long period, must be laid up.

In laying up it's necessary to applicate an even distributed coat of lubricant, that is to be heated up to 60°, on the parts, which must be laid up.

N	Part name	Lubricant	Method of laying up.
1	Nuts and screws, fastening the casing "KC" to the motor alternator.	push-type lubricant	Thick coat
2	Unpainted spots of the motor-alternator bearing	push-type lubricant	Thick coat

Plug connector should be wrapped up using waterproof paper.

Spots, which must be coated with the lubricant must be cleaned: fat and dirt should be removed by the use of a

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clean rag wetted with benzine; then the spots are to be dried.

Note: Do not touch the spots which are to be laid up.

If corrosion takes place, it must be removed by means of type "000" sandpaper, wetted with oil. Damaged parts must be polished by the use of the polishing composition "ГОИ".

The laid up motor-alternators should be stored without packing on shelves in a dry room.

The shelves for motor-alternator must be made of lumber, relative humidity of which should not be more that 18 percent. The shelves must be painted and kept clean.

The motor-alternators are not allowed to be stored directly on the shelves. A sheet of paraffined or oil-paper must be laid up under the units.

In withdrawing the units from storage it's necessary to remove lubricant by means of a rag, wetted with bensine; then the parts are be dried.

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Appendix N 10

INSTRUCTION

of the unit K1-7M gear washing and lubrication

The unit K1-7M gears must be washed and lubricated after each 10 hours operational period.

The gears of the refernce voltage generator, of the motor DI-41 and of the exciter shaft must be washed by means of a brush, wetted slightly with benzine B-70 GOST 1012-51. Rotation of the gears during washing is to be carried out by rotating smoothly the exciter. This operation must be repeated till old lubricant will be removed from gear teeth.

It's necessary to see to it that the bearings of the refernce voltage generator and of the motor were not splashed with benzine. With a view to remove excess of benzine it's necessary to shake the brush.

After washing switch on the unit to remove remainder benzine. The unit must operate during 1-1,5 min. Then switch off the unit and after it will stop apply thin coat of the lubricant OKB-122-7 TU-142-57 on the teeth of the gears by means of a brush, retating smoothly the exciter.

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Appendix N 11

L i s t

of feasible faults of the Rader K-1M and methods of repairing

A. Mechanical faults

	Fault character	Method of elimination	Who must eliminate the fault	Remarks
1	2	3	4	5
1	Damage of panel coating of the units, installed in the framework, as well as damage of lids of the units K1-12MP and K1-13M	Overlay damaged spots with the black nitro-depo DM TY MXП 911-41	Technical personnel of the storehouse or military unit	
2	Damage of metallization crosspieces of the framework for the units, of the unit K1-12MP framework, of the MA-500M, MA-250M and unit KI-7M housings.	Replace damaged crosspieces.	-"-	
3	Cracked bushing of the unit control socket	Replace control socket	-"-	
4	Cracked filler of the H.F. plug connectors of unit and cables.	Replace damaged plug connectors	-"-	

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1	2	3	4	5
5	Damage of the unit K1-3M waveguide flexible sections	Replace damaged shock-absorber	-"-	
6	Damage of shock-absorbers of the framework for units, of the framework for the unit K1-12MP and motor-alternaters MA-500M and MA-250M.	Replace damaged shock-absorber	-"-	
7	Corrosion in waveguide seams of the units K1-4aM, K1-46 M, K1-3M	Remove corrosion without damaging the inner covering, wash the damaged spots with sprit or acetone and then overlay two coats of the lacquer GOST 5236-50. Drying period for each coat is no less than 20 min.	-"-	
8	Cracked plastic block and damaged pins of the unit plug connectors.	Replace block or damaged pin.	-"-	

Note: Elimination of the defects, which are not mentioned in the List, is allowed to be carried out by the personnel of the storehouse or military unit.

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B. Electrical parameter failure

	Fault indication	Possible cause of failure	Method of elimination	Who must eliminate the failure
	2	3	4	5
1	The 115v is absent at the unit K1-10M monitoring jacks "MA-500M"	1. Faulty motor-alternator MA-500M	Replace motor-alternator	Storehouse (military unit technical personnel
		2. Poor contact of the fuse P-3 of the unit K1-13M	Bend spring jack of the fuse.	-"-
		3. Fuse P-3 is burnt out	Replace fuse	-"-
2	The 115v is absent at the unit K1-10M monitoring jacks "MA-250M"	1. Faulty motor-alternator MA-250M	Replace motor-alternator	-"-
		2. Poor contact of the fuse P-2.	Bend spring jack of the fuse	-"-
		3. Fuse P-2 is burnt out.	Replace fuse	-"-
3	The +130v is absent	1. Faulty unit K1-10M tubes 2, 3 or 4.	Replace defective tube.	-"-
4	The +300v reg. is absent	Faulty unit K1-10M tubes 6 or 7	Replace defective tube.	-"-

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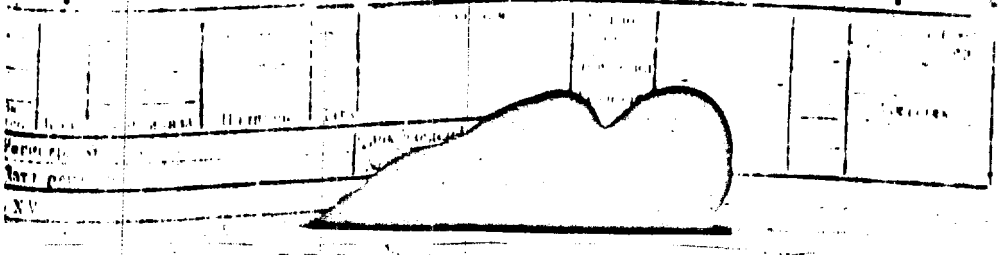
	2	3	4	5
6	The -300v reg. or the -147v reg- is absent.	Faulty unit K1-10M tubes Л10 or Л7	Replace defec- tive tube	-"-
7	The +300v unreg. is absent.	Faulty unit K1-10M tube	Replace defec- tive tube	-"-
8	The A.G.C. voltage does not vary, when the mixer-A input power is varied and the board K-109 switch "АРУ" is in the position "A".	Faulty unit K1-5M tube 13	Replace defec- tive tibe	-"-
9	Simultaneous absence of the crystal current of the mixers "A" and "B"	Absence of the klystron oscil- lation	Replace klystron (sequence of the klystron replacement is given below).	-"-
10	Absence of the crystal current of the mixer-B.	Faulty crystal "DKC-4" of the unit K1-4aM or of the K1-4bM.	Replace crystal (sequence of the replacement is given below).	-"-
11	The lamp "Н.П.Д." is lit up becomes dim before the time motor stops in the start po- sition.	Failure of the spring set "start position of the time- motor" adjus- ting.		K-1M manufac- turer
	Command N 2 time delay is lower than preset time delay	Faulty matching of command spring set "com.N 1" and "com.N 2" locking of the time motor		-"-



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1	2	3	4	5
12	The A.F.C.system does not lock the signal frequency	The unit K1-5M capacitor C41 is broken down.		-"-
13	The regime A and B course driving voltages are absent, when the reference voltages and the error-signal are all right.	Faulty unit K1-6M tubes 5, 6, 7, 17, 18	Replace defective tube.	Storehouse (military unit technical personnel)
14	The regime A and B elevation driving voltages are absent, when the reference voltages and the error signal are all right.	Faulty unit K1-6M tubes 14, 15, 16, 19, 20	Replace defective tube	-"-
15	The regime A reference voltages are absent.	Faulty unit K1-6M tubes 1, 2, 3	Replace defective tube.	-"-
16	The regime B reference voltages are absent.	The unit K1-5M reference generator winding breakage.		K1-7M manufacturer
17	The regime B and reference voltages are absent.	1.Faulty unit K1-6M tubes 4, 6, 13, 14 2.The unit K1-9M voltage +27v does not go to the unit K1-6M relay.	Replace defective tube.	Storehouse (military unit) technical personnel. K-1M manufacturer

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	2	3	4	5
18	The regime-A error-signal is absent.	1.The range potentiometer of the time motor is broken.		-"-
		2.Faulty unit K1-6M tubes 9, 10, 11, 12	Replace defective tube.	Storehouse (military unit) technical personnel
19	The regime-B error-signal is absent	1.The unit K1-9M voltage +27v does not go to the unit K1-6M relay		K-1M manufacturer
		2.Faulty unit K1-6M tubes 8, 10, 11, 12	Replace defective tube	Storehouse (military unit) technical personnel
20	The driving voltages are fluctuating in the regime A.	Breakdown of capacitors C26, C27, of the unit K1-6M.		K-1M manufacturer
21	The unit K1-12M output power is insufficient or absent.	The unit K1-12M tube ГИ-13Б emissitivity is out.	Replace tube	Storehouse (military unit) technical personnel
22	The autoselector does not searching	Faulty unit K1-9M tube 1	Replace tube	-"-
23	The autoselector locking on range distant border is changed.	Faulty unit K1-9M tube 1	Replace tube	-"-

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	2	3	4	5
	Looking on range lower border is identical to the tracking range lower boarder	The unit K1-9M relay P4 is defective		K-1M manufacturer
	The strobe-pulse is absent at the unit K1-9MP jack "strobe".	Faulty unit K1-6M tube 1 or unit K1-9M tubes 9, 10, 11, 13	Replace defective tube	Storehouse (military unit) technical personnel
26	The autoselector does not lock on the echo-pulse when the unit K1-8M switch is in the position "strobe" (when it is in the position +, there is error-signal at the unit K1-8M jack "error-signal")	1.Faulty unit K1-9M tubes 3, 4, 5, 11, 12 2.The unit K1-13M relay P1, which blocks the unit K1-AM, does not operate.	Replace defective tube.	-"- K-1M manufacturer
27	Heightened uproar and crack when the unit K1-7M exiter is rotated.	The unit K1-7M is defective	Replace unit K1-7M	K-1M manufacturer
28	The unit K1-6M has no filament supply	1.The MA-250 feeder thimbles are broken. 2.The fuses P-1 or P-2 are burnt out.	Repair thimbles. Replace fuse	Storehouse (military unit) technical personnel

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Note: 1. In repairing, it is necessary to use the spare parts, which are enclosed to the Radar K1-M.

2. The replacement of all the lamps, which are not mentioned above, is allowed to be carried out by the technical personnel of the military unit or storehouse.
3. The replacement of the other circuit elements is allowed to be carried out by the Radar K-1M manufacturer only.
4. All the works made should be registered in the Radar K-1M Certificate (sheet "Remarks concerning operation").

The tube replacing is to be carried out in accordance with the "Instruction of the Radar K-1M tube replacement" (see appendix N 5).

The replacement of the klystron is to be carried out in the following order (the Radar being switched off): unscrew the klystron box cover, release 2 screws inside the box, slide out the holding plates, take away the tube cap and withdrow the klystron, insert a new klystron and fasten it following the reverse order.

With a view to replace the crystals of the unit K1-4aM and K1-46M, unscrew the nut and take away the crystal holder with the crystal.

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When a person, who is held responsible for elimination of faults, is not mentioned in this list, a fault may be eliminated by the technical personnel of the military unit (or storehouse, where the Radar K-IM is stored) or by a representative of the Radar K-IM Manufacturer.

Note: In revealing causes of fault, it's necessary firstly to be sure that the test equipment is all right.

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Appendix N 12

Instruction

of replacement of the Radar K-1M matched tubes

The following matched tubes and crystals are added to each of the Radars (SPS 1:1)-

Tubes: 5Л6, 5Л7, 5Л12, 6Л6, 6Л15, 5Л19, 5Л10, 9Л13, 12Л13.

Crystals: 4aD1 and 4б D1

In case of failure, any tube or crystal listed above is allowed to be replaced by using one of the tubes (crystals), forming part of the SPS-1, or any other one.

In replacing the tubes or crystals it's necessary to check parameters, indicated in the Table 1.

In replacing any tube (crystal), the tube (crystal) may be considered matched, if the parameters are kept within the indicated tolerances.

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Table N 1

Tube name according to the elementary diagram		Parameter to be checked in replacing tube	Remarks
1		2	3
5Л6 5Л7	5Л10 5Л10	Channel AFC sensitivity AFC band	
5Л17		Synchronization channel sensitivity. 1) Synchronization channel sensitivity 2) Synchronization pulse amplitude at the socket "K synchr." (cable N 26 is disconnected).	No less than 60 v positive polarity at P_{input} = 35 dbm
6Л6	6Л15	Angles between the "A" co-ordinate axes	
9Л13		Pulse parameters at the plug connection ø 23 (cable N 22 is disconnected).	2.2±0.4 sec on the level 0.5 of posit. polar.
Crystal 46Д1		Check all the "B" parameters according to 1A.250.000	Amplitude 85 ± 125 v.
Crystal 4аД1		1) Check all the "A" parameters according to 1A.250.000 2) Transit attenuation between the sides "A" and "B" must be equal to 40 db.	

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Appendix 7

U P U - 1 register (1 for 1)

No.	Name	Type	Number	Position number
1	Tube N 1	6Н1П	1	5Ж7
2	Tube N 2	6Н2П	1	6Ж6
3	Tube N 3	6Н2П	1	6Ж5
4	Tube N 4	6Н1П	1	5Ж3
5	Tube N 5	6Н1П	1	5Ж2
6	Tube N 6	6Ж1П	1	[illegible]
7	Tube N 7	6Н1П	1	5Ж0
8	Crystal	ДК-С4	2	4а1
9	Crystal	ДК-С4	2	4С1
10	Tube N 8	6Ж2П	1	5Ж10
11	Tube N 9	6Н1П	1	12Ж
12	Bus	ВЖ7.755.039	1	

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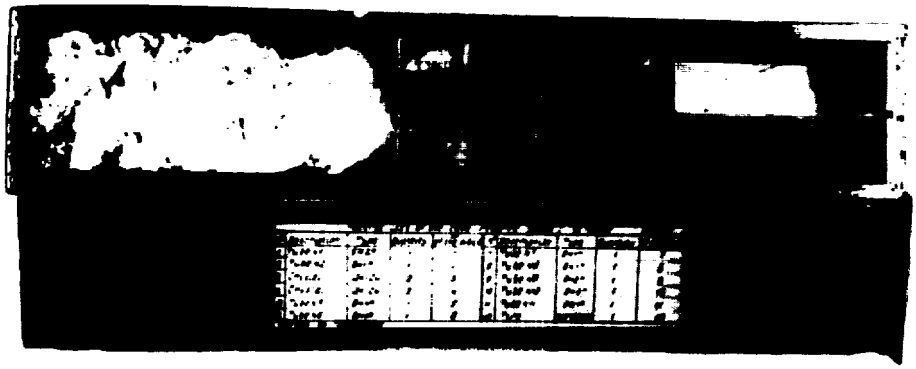

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Appendix N 14

S P S - 2 register (1 for 50)

	Name	Code	Drawing N	Number	Remarks
1	2	3	4	5	6
1	Damped framework	K1-0	1A.550.000 01-00	1	
2	"A" mixer	K1-4aM	1A.552.000	1	
3	"B" mixer	K1-4BM	1A.552.010	1	
4	Autopilot control unit	K1-6M	1A.554.000	1	
5	"B" antenna	K1-7M	45275Гр	1	
6	"A" receiver	K1-5MP	1A.553.000	1	
7	"B" receiver	K1-8M	1A.553.020	1	
8	Autoselector	K1-9M	1A.555.000	1	
9	Rectifier	K1-10M	1A.556.000	1	
10	Responder	K1-12MP	1A.557.000	1	
11	Transformer	12TP-1	1A.650.050T	3	
12	Transformer	10TP-1	1A.650.040T	1	
13	Klystron key	-	AP18-2-0-145	5	
14	Tubes	6Ж7П		4	
		6Ж2П		2	
		6Н1П		2	
		6Н2П		2	
		6Н13С		2	

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1	2	3	4	5	6
		6Ц4М		3	
		6К3		2	
		6П2С		2	
		6Ц5С		2	
		С13П		2	
		ГИ-30		2	
		ГИ-13Б		5	
15	Klystrons	К-38		5	
16	Fuses	ПЦ-30-1		10	
		ПЦ-30-2		10	
		СП -5А		10	
		СП -15А		10	
17	A waveguide flexible section		1А.551.000/ /08.000	5	
18	B waveguide flexible section		37-с-1-88	5	
19	Electric solde-ring iron 27 v.		1А-753.020 04-00	1	
20	Electric solde-ring iron 220 v.		МЭП	1	
21	Clock screw driver 3x0.3		СП -487	1	
22	Screw driver 215x0.5		СП -485	1	
23	Pliers =125 • 150		GOST 7236-54	1	

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1	2	3	4	5	6
24	Folding hack knife			1	
25	Nippers =125 + 150		GOST 7282-52	1	
26	Pincers	A-13	GOST 3115-54	1	
27	Double-ended spanner 9x11		54411-04 064	1	
28	Double-ended spanner 14x17		1A.753.020/8	1	
29	Wrench for attenuators		1A.753.020/5	1	
30	Special wrench		1A.753.020/06-00	1	
31	Special socket wrench M4		1A.753.020/05-00	1	
32	Spanner		BП 6.468.001	1	
33	Socket wrench		BП 6.468.002	1	
34	Double-ended spanner 19 x 22		1A.753.020/07	1	
35	Wrench for circular nuts		1A.753.020/6	1	
36	Solder OC-61		GOST 1499-54	100g.	
37	Box containing rosin		1A.753.020/02-00	1	
38	Belts for framework fastening		1A.753.000/01-04	10	
	Single-throw switch	TP-2-1	OH.M 02522-52	2	
	Capacitor 120-79	БГП-1 150-0.5	ОЖ0.462.020	4	
	Capacitor 120-16	БП-1-1- 500-10- 0.025		4	

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1	2	3	4	5	6
42	Capacitor	СГМ-4 ОЖ0.461.003ТУ 1000 - 5100		4	
43	Resistor 10R-1	ПВЭ 25 ОЖО.467.011ТУ 360-		2	
44	Resistor 10R-33	ПЭВ -15-0ЖО.467.011ТУ 3000-		2	

Note: SPS incudes an cover made of polychlorovinyl film (B 6.832.006) and destined for the framework with its units as well as 2 bags; each bag contains 100 g of silica gel.

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Appendix N 15

UNIT "C Л KC-IA"

II. THE UNIT OPERATIONAL INSTRUCTION

1. General

When the unit "C KC-IA" is used, it is necessary to:

a) Set a necessary operating sensitivity of the unit.

b) Install the unit into the missile "KC" and check its efficiency.

c) Check the unit efficiency, when overall checking on the ground and in the air takes place.

2. Setting of the unit operating sensitivity is to be carried out in the following succession:

a) after checking and tuning the Radar K-1M and the autopilot, do not switch off the equipment K-100M; disconnect the cable N 13 from the board K-109 and connect it to the unit "C Л KC-1A";

b) connect the d.c. voltmeter (class 2.5% and scale range 0-150 v) to the jack "[-1" and to the ground;

c) Switch on the Radar K1-M, set an "A" input signal power equal to -45 dbm;

N o t e: The unit "C Л KC-1A" checking must be carried out at the start position of the range potentiometer.

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d) turn the unit "СД КС-1А" potentiometer R9 knob "sensitivity" clockwise as far as it will go; when it will be done, the voltmeter must indicate voltage at the jack "Г1";

e) turn slowly the potentiometer R9 knob counter-clokwise until the jack "Г1" voltage dasappeares;

f) increase the signal power up to -43 dbm; voltage must appear at the jack "Г1" in this case;

g) fix the potentiometer R9 axis by means of the lock-nut and make sure that when input power is -43 dbm, there is a voltage at the jack "Г1";

h) switch off the Radar К1-М; disconnect the cable N 13 from the unit "СД КС-1А" and from the missile "КС" socket Ш -13.

3. Installation of the unit in the object "КС"

The unit "СД КС" is fastened by means of four screws to the holder, which is placed between frames N 4 and N 5 on the port side of the missile "КС".

When the unit "СД КС-1А" is installed in the missile, it is necessary to:

a) connect cable N 20 to the socket "Ш-13" and the unit "СД КС-1А";

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b) connect cable N 21 to the unit "СЛКС-1А" socket Ш-21;

c) switch on the Radar and the Autopilot;

set the signal power equal to (-35 dbm) ÷ (-40 dbm);

d) push the button "КОМ N 1" of the board "К-109";

cut off the radar-tester "31-И М" triggering and measure time interval between the "31-И М" cutting off and the moment of the unit "СЛКС-1А" dive signal appearance.

When the unit "СЛКС-1А" is operating normally, the missile "КС" elevators must deviate down by $6^{\circ} \pm 2^{\circ}$ in 6 sec ± 2 sec after switching off the readar-tester 31-И М. At the same time the poiter of the board "К-109" elevator indicator must deviate to the left and indicate a scale division within 9 ± 1. A deviation of the elevator pointer to the left as far as it will go or to the right 4 ± 1 scale division indicates failure of the contact of the "drop" or "-27v" network.

e) Release the button "КОМ.N 1";

f) set a signal power equal to -43 dbm; push the button "КОМ. N 1", wait 8 ÷ 10 sec; the unit must not produce the dive signal; release the button "КОМ. N 1";

g) decrease the input signal down to -45 dbm; push the button "КОМ.N 1"; 6 ± 2 secs later the unit must produce the dive signal;

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h) switch off the Radar and the Autopilot.

Warning: The unit "СЛКС-1А" operating sensitivity should be checked before every flight with missile "КС" dropping!

4. The unit efficiency checking on the mother-ship

The unit "СЛКС" efficiency checking is to be carried out jointly with the complete system checking on the ground, in the air and before laying on fighting course by the mother-ship crew.

The checking should be carried out in the following succession:

a) the unit is to be checked after the overall complete system checking;

b) when the Radars К-1М and К-11М are switched on and the Autopilot is catched, the navigator-bombaimer should push the board "ДК-17М" button "command N 1" and order "Attention, switch off the high voltage!" to the navigator-operator;

c) measure time interval between the Radar К-11М transmitter switching off and the moment of the unit "СЛКС-1А" dive signal appearance. When the unit is opera-

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ting normally the pointer of the board "DK-17M" elevator indicator must deviate to the left at 9 ± 1 division in 6 ± 2 sec. after the moment of the Radar KIIM transmitter switching off;

d) release the button "command N 1"; the indicator pointer must be set on the point of departure.

Warning: A simultaneous checking of the unit "САКО-1А" and the unit "П-18М" is forbidden strictly!

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Appendix N 16

INSCRIPTIONS

on the front panels of the measuring instruments

I. BOARD K-109

1. "КС под током" - "KC switched on"
2. Нач.П.Д. - Range potentiometer start position
3. Конец П.Д. - Range potentiometer end position
4. АРУ - "AGC" (automatic gain control)
5. Ком.отц. - drop command
6. Питание станции - Radar supply
7. Ком. N 1 - command N 1
8. Ком. N 2 - command N 2
9. Возврат П.Д. - return range potentiometer
10. Контроль питания - supply monitoring
11. Эквивалент АП - Autopilot equivalent
12. ОН А/Б - reference voltage A/B
13. "выкл." - "off"
14. "вкл." - "on"
15. "внутр." - internal
16. "внешн." - external
17. КС - вверху - "KC above"
18. КС - слева - "KC to the left"
19. КС - справа - "KC to the right"
20. КС - внизу - "KC below"

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21. УН курса - "course driving (or control) voltage
22. УН высоты - elevation driving (or control) voltage

II. UNIT K-101M

1. Частота м/н - frequency
2. Инд.цуля - zero indicator
3. Задержка - delay
4. Ручная - manual
5. Автомат - automatic
6. Ближе - nearer
7. Дальше - farther
8. Скор.задержки - delay speed
9. Быстро - quickly
10. Медленно - slow
11. Прибор - instrument
12. Модуляция - modulation
13. Накал - filament
14. Анод - plate
15. Синхр. - synchr (onization)
16. Н.Ч. - L.F. (low frequency)
17. Ампл.мод. - amplitude of modulation pulse
18. Ампл.синхр- amplitude of synchronizing pulse
19. Фаза - phase
20. Ток кристалла - crystal current
21. Запуск ПИ8-МО - 18-MO start
22. Ампл.ОН 0^0, 90^0 и глубина ЧМ - Reference amplitude 0^0; 90^0 and frequency modulation percentage

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23. Выход - (pulse) output

24. Выход синхр. - synchroniring pulse output

III. BOARD DK-17

1. Режим контроля - monitoring regime

2. Режим А(Б) управления - regime A(B) guidance

3. Переключатель контроля подвесов - monitoring switch of the suspended "KC"

4. Левая - left

5. Правая - right

6. Режим А (Б) баланс - balancing in regime A(B)

7. Контроль ОН - reference voltage monitoring

8. Отцепка - dropping

9. К-1Под током - K-1M switched on

10. Сигн.НИД - R.P.start position signal

11. Ком.2 - command 2

12. Ком.1 внешн. - command 1 external

13. УН курса - course driving (or control) voltage

14. УН высоты - elevation driving (or control) voltage

IV. INSTRUMENT 31-UM

1. Род работы - kind of work

2. IV внешн. - IV external

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V. ШАУ - REMOTE CONTROL BOARD (RCB)

VI. BOMBARDIER'S BOARD

1. Питание системы - system supply
2. К-1М и АП - K-1M and autopilot
3. КС подвешен - "KC" is suspended

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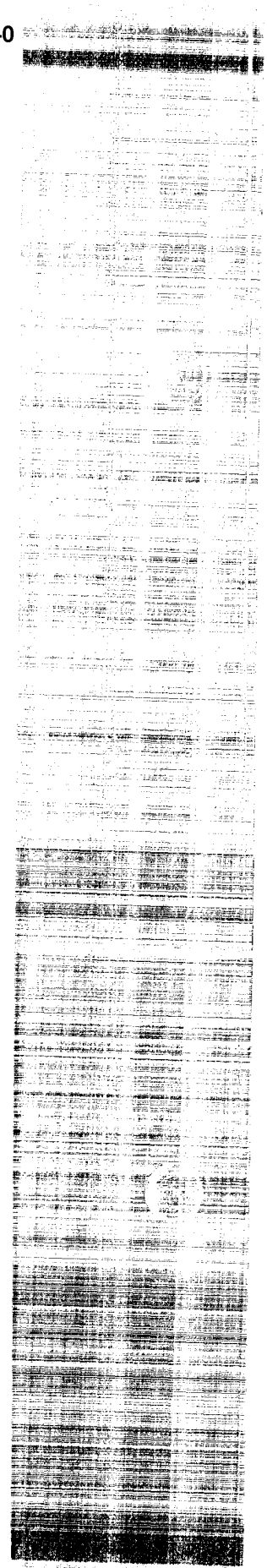

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